CALCUTTA:
BISHOP'S COLLEGE PRESS.
M.DCCC.XLV.

JOURNAL

OF THE

Agricultural & Horticultural Society

OF

INDIA.

EDITED BY

THE COMMITTEE OF PAPERS.

VOL. IV.

PART I.—JANUARY TO DECEMBER, 1845.

ORIGINAL COMMUNICATIONS.

A body of men engaged in the same pursuit, form a joint stock of their information and experience, and thereby put every individual in possession of the sum total acquired by them all.'—REV. DR WILLIAM CAREY

CALCUTTA:
BISHOP'S COLLEGE PRESS.
M DCCC.XLV.

Contents

OF PART I, VOL. IV.

No. 1.

Page.

ART. I.—Memoir of the late William Griffith, Esq. F. L. S. Assistant Surgeon in the Honourable East India Company's Service on the Madras Establishment. By J. M'Clelland, Esq, ... 1

II.—Correspondence connected with the supposed discovery of a Teak Forest on the banks of the Koladine river, in Arracan, ... 40

III.—Report on the existence of Teak trees on the Banks of the Thaddé stream, in the vicinity of Sandoway, ... 49

IV.—Report on the Thoungyeen River, (Tenasserim Province,) and on the Teak Forest in its vicinity, ... 51

V.—A descriptive account of the tree which produces the Gutta Percha; by the Rev. Edward White. Communicated by F. J. Mouat, Esq., M.D., ... 59

No. 2.

ART. I.—Observations on the applicability of Artificial Manures to the cultivation of the Sugar-cane, with some suggestions for the amelioration and extension of the Sugar cultivation in Bengal. By T. F. Henley, Esq., ... 61

II.—Correspondence regarding the experimental Cotton cultivation in Rungpore, with a few remarks on the staple products of that District, ... 92

III.—Extracts from Reports on Cotton and on the Experimental Cotton Farm at Gorruckpore, ... 105

IV.—On the Chinese methods of Tile and Brick-making, of burning shells for Lime, of expressing Oils, &c. Communicated by A. Grant, Esq. Bengal Medical Service, ... 110

V.—Communication from Mr. Southey, on the improvement of the breed of Sheep in India, ... 114

No. 3.

Art. I.—Observations on the quality, &c. of the principal Timber trees growing in the vicinity of Jeypore, in Upper Assam. By Capt. S. F. Hannay, (40th Regt. N. I.) Commandant of the Assam Light Infantry Battalion, ... 117

II.—Note on the Cotton of the Chittagong District. By A. Sconce, Esq., Bengal Civil Service, ... 135

III.—A few hints to Plant Collectors, by Mr. Robert Ross, Head Gardener, H. C. Botanic Garden, Calcutta, ... 138

IV.—On the mode of cultivating and preparing Cacao in the West Indies. By Mr. A. L. Harris, ... 140

V.—Further remarks on certain varieties of Sugar-cane. By J. V. Thompson, Esq. M.D., Deputy Inspector General of Hospitals at Sydney, ... 143

VI.—On a method of ascertaining the amount of Crystallizable Sugar in Khar or Muscovado. By J. W. Laidlay, Esq., ... 147

VII.—Further correspondence connected with the experimental Cotton cultivation in the District of Dacca, ... 151

No. 4.

Art. I.—Report on the Cultivation and Manufacture of Tea in Kumaon and Gurhwal. By William Jameson, Esq. Superintendent Botanical Gardens, North-Western Provinces, ... 173

II.—Botanical Observations in Upper Assam; being Part 6th of a Report on the Operations of the Assam Company in the Southern Division, to the month of February, 1843. By J. W. Masters, Esq., ... 197

III.—On the Fertilizing Properties of the Well-Water of Calcutta. By J. W. Laidlay, Esq., ... 235

IV.—Note on the Cultivation and Preparation of Madder. By a Member of the Society, ... 239

V.—Further correspondence connected with the Government Experimental Cotton Cultivation at Dacca. 241

Index

TO PART I, VOL. IV.

Page.

Botanical Observations in Upper Assam. By J. W. Masters, Esq. ... 197

Cotton cultivation (experimental) in Rungpore. Correspondence regarding the, ... 92

——— Farm (experimental) at Gorruckpore. Report of the, ... 105

——— of the Chittagong District. Note on the, By A. Sconce, Esq. 135

——— Cultivation (experimental) in the Dacca District. Further Correspondence connected with the, ... 151, 241

Cacao. On the mode of cultivating and preparing in the West Indies. By Mr. A. L. Harris, ... 140

Gutta Percha tree. A descriptive account of the, By the Rev. E. White, ... 59

Griffith, William. Memoir of, By J. McClelland, Esq. ... 1

Manures (artificial) for cane culture. Observations on the applicability of, By T. F. Henley, Esq. 61

Madder culture and preparation. Note on, ... 239

Plant Collectors. A few hints to, By Mr. Robert Ross, ... 138

Sheep in India. On improving the breed of, By Mr. Southey, ... 114

Sugar-cane. Further remarks on certain varieties of, By Dr. J. V. Thompson, ... 143

Sugar (Crystallizable) in Khar or Muscovado. On a method of ascertaining the amount of, By J. W. Laidlay, Esq. 147

Teak forest on the banks of the Koladyne River, in Arracan. Correspondence connected with the supposed discovery of a, ... 40

—— trees on the banks of the Thaddé Stream, in the vicinity of Sandoway. Report on the existence of, ... 49

—— forest in the vicinity of the Thoungyeen River (Tenasserim Province.) Report on the, ... 51

Timber trees in the vicinity of Jeypore, (Upper Assam.) Observations on the quality of the, By Captain S. F. Hannay, ... 117

Tile and Brick-making, burning shells for Lime, expressing Oils, &c. Chinese methods of, Communicated by A. Grant, Esq. 110

Tea cultivation and manufacture in Kumaon and Gurhwal, Report on, By William Jameson, Esq. 173

Well-water of Calcutta. On the fertilizing properties of, By J. W. Laidlay, Esq. 235

INDEX TO NAMES OF CONTRIBUTORS

TO PART I, VOL. IV.

Page.

Bogle, Major A. Communication regarding the supposed discovery of a Teak forest on the banks of the Koladyne River, in Arracan, . . 40

Blount, Mr. S. M. Report regarding the experimental Cotton Farm at Gorruckpore, ... 105

Dunbar, J. Esq. Communication respecting the experimental cotton cultivation at Dacca, ... 151

Grant, A. Esq. On the Chinese methods of Tile and Brick-making, of burning shells for lime, of expressing Oils, &c. 110

Hopkinson, Lieutenant H. Communication regarding the supposed discovery of a Teak forest on the banks of the Koladyne River in Arracan, ... 46

Henley, T. F. Esq. Observations on the applicability of artificial manures to the cultivation of the Sugar-cane, ... 61

Hannay, Captain S. F. Observations on the quality, &c. of the principal timber trees growing in the vicinity of Jeypore, in Upper Assam, 117

Harris, Mr. A. L. On the mode of cultivating and preparing Cacao in the West Indies, ... 140

Jackson, W. B. Esq. Communication regarding the experimental Cotton Farm, at Gorruckpore, ... 105

Jameson, Wm. Esq. Report on the cultivation and manufacture of Tea in Kumaon and Gurhwal, ... 173

Laidlay, J. W. Esq. On a method of ascertaining the amount of crystallizable sugar in Khar or Muscovado, ... 147

——————— On the fertilizing properties of the Well-water of Calcutta, ... 235

M'Clelland, John Esq. Memoir of the late William Griffith, Esq. ... 1

Maling, Mr. W. R. Report on the Teak forests on the Thoungyeen River, Tenasserim Province, ... 51

Masters, J. W. Esq. Botanical Observations in Upper Assam, ... 197

Phayre, Captain A. P. Communication regarding the existence of Teak in the Sandoway district, (Arracan,) 46, 49

Price, J. O. Reports regarding the experimental cotton cultivation at Dacca, ... 151, 241

Ross, Mr. Robert. A few hints to Plant Collectors,... ... 138

Southey, Thos. Esq. Communication on the improvement of the breed of Sheep in India, ... 114

Sconce, A Esq. Note on the cotton of the Chittagong District, ... 135

Thompson, Dr. J. V. Further remarks on certain varieties of Sugar-cane, ... 143

White, the Rev. Edward. A descriptive account of the tree which produces the Gutta Percha, ... 59

THE JOURNAL

OF THE

Agricultural & Horticultural Society

OF

INDIA.

Memoir of the late WILLIAM GRIFFITH, *Esq., F. L. S. Assistant Surgeon in the Honourable East India Company's Service on the Madras Establishment. By* J. M'CLELLAND, *Esq.*

[The Committee of Papers of the Agricultural and Horticultural Society of India—of which Mr. Griffith was, until so recently, a most able, experienced, and valuable member—cannot permit the following Memoir of their late esteemed and distinguished colleague to appear, without the expression on their part, of feelings of the deepest and most sincere regret at the loss which science has sustained. The Society has already recorded its opinion of Mr. Griffith in the following resolution, passed at the first General Meeting held after the receipt of the melancholy intelligence of his demise :—

> "That the Society is deeply sensibly of the loss it, as well as the science of Botany, has sustained in the death of William Griffith, Esq., one of the Society's most valuable members. It readily accepts the charge tendered by Mr. M'Clelland of the surplus numbers of the Journal of Natural History, and offers its best thanks to him for the Memoir of his late friend."

Mr. Griffith was not only one of the most eminent, original, and indefatigable Botanists in India, but was always so ready, willing and anxious to advance the interests of the Society in every way, that he was, perhaps, of all the members of that numerous body, the one whose services could least have been spared, and will be most missed. Notwithstanding the importance of, and incessant occupation afforded by his own mere immediate pursuits, he was never once known to withhold his assistance when it was required, or to perform carelessly and in a grudging spirit the labour of examining the papers submitted for his opinion. Whether he be regarded then in the light of a scientific character of the highest order of merit,—as a most zealous, indefatigable member of the Society,—or as a private friend of frank, unassuming manners and address,—few will be inclined to dispute the heavy nature of the loss, which all have experienced, by his premature decease, in the midst of his useful, honorable, and distinguished career.]

He was the son of a merchant in London who died early in life, leaving a numerous family before he had time to provide affluently for it. His mother also died early in life, so that the children were well brought up by guardians. The family have been singularly unfortunate. Of four brothers who came out to India, three of them in the military service of the Hon'ble Company, Capt. Griffith, 11th Madras Native Infantry now only survives; and a nephew, the eldest of a numerous family, Lieut. Sanders, a fine, intelligent and promising young officer 18 years of age, was drowned on the river at Barrackpore only a few months ago, by the up-setting of a boat. Mr. William Griffith, the subject of our sketch, ever expressed the deepest gratitude to his guardians for the care bestowed by them on his family; and it was only a few months prior to his death, that he remitted to them the last instalment of the full amount they expended on his early education, in order that the limited means left for the benefit of his sisters might in no wise be diminished on his own account. These payments together with the expense of his pursuits kept him always without money, which he only regarded as the means of doing good, and may afford an idea of his generous character and liberal disposition.

He was born in March 1810, at Ham, and was educated at a good school near Pultney, from which several of his cotemporaries entered the civil and military service of India. After completing the ordinary course of education, he was apprenticed to a Surgeon residing in the west end of London, and soon after began to attend the classes at the London University, being one of the original pupils who entered about the opening of that School in 1829.

Zoology at first appears to have been his predominant taste, as I learn from a copy of Fleming's History of British Animals, which with some other books that had become useless to him, he left with me on his recent departure for Malacca, remarking, that it was well for Zoology he adopted Botany as his pursuit.

In the first of these books are numerous manuscript notes in his own hand, of which the following examples, apparently written when spending a Christmas vacation with his family, (who resided at a seat called Newlands near Harrow,) may remind most of us of the early associations of boyhood, while they exhibit at the same time an original simplicity of thought and observation, affording just promise of the future rank and distinction he attained.

Turdus viscivorus. The Missel Thrush. Common, associating with T. pilaris and T. merula, in stripping the hawthorn trees of the berries ; I had not seen it before ; voice very grating, somewhat like that of the jay, but much weaker.
December, 31, 1829.

T. *pilaris*. Fieldfare. Common, but until to-day not occurring in flocks, the berries of hawthorn a favourite food.

A beautiful and very elegant bird, the reddish-yellow about the throat and breast varying in quantity, and in brightness ; legs varying from dusky to nearly black. Bill with nearly as little yellow as that of T. viscivores's.

T. *merula*. Blackbird· Nest very different from that of the thrush, and by no means so neat. It is composed internally of fibres while that of the thrush is plastered with clay, &c. December, 31, 1829.

Motacila alba. Wagtail. A solitary one seen at Newlands, 23d December, 1829, on a remarkably cold day.

Parus major? Titmouse. Common, frequenting the farm yard and trees in the Park. A restless bird, hardly ever remains a minute in one place.

P. cærulens. Blue Titmouse. Common in gardens, a beautiful but small bird, very active and very noisy, climbs trees readily and in every direction.

Pyrgita domestica. Sparrow. Common every where about houses, towns, &c. and universally reprobated as a desperate marauder. The male however is rather handsome, certainly a very neat bird, but the female is one of the plainest. In making their nests they shew a singular extravagance, not half the materials being wanted; the nests are made of every thing the bird can lay hold of.

Fringilla cælebs. Chaffinch. Almost as common, and quite as great thieves as the sparrows, but much more tame, and unsuspicious; almost all males, as I have only shot one female to day, (December 23, 1829.) The color of the males seems to vary much in the winter, as there is then much more red about the breast. The male is a handsome bird, the female far less so. They have the power of erecting the feathers of the head, thus forming a crest; their nests are beautiful specimens of what can be done by instinct. The bill is whitish, not blue, at least in winter.

Woodville and Stevenson's, and Churchill's works on Medical Botany—remarkable for the beauty of their illustrations,—were also studied by him about this period. In 1830 he obtained the Linnæan gold medal given by the Society of Apothecaries for high attainments in medical Botany, which he studied at the Apothecaries' Garden in Chelsea, under Mr. Anderson.

In such a school as the London University a mind like his could not remain long unsettled, without attaching itself to some branch of science on which he might stamp his superiority.

The higher branches of botanical science developed in the lectures of Professor Lindley, soon fixed his attention, and his future Christmas and other vacations were spent in botanical excursions, instead of remaining with his family at Newlands.

His reminiscences of these little excursions, auspicious of the more extended and enterprising travels in after life which distinguished his services in India, and contributed so largely to science, were dwelt upon by him with much interest, particularly as contrasting the poverty of an English, with the exuberance of an Indian Flora.

On these occasions he carried suspended to his shoulder his portable herbarium, sufficient to hold all the varieties of plants he could obtain in a week's excursion. But in Assam or the Khasyah mountains, he could not on the contrary go out for a day, without returning not only laden himself with collections, but a train of followers also, whom he always enlisted into his service from the nearest village to his encampment. On his early botanical excursions in England he used like Linnæus and many other great men, to carry his wallet on his shoulder, containing the necessary changes of linen and of dress, the latter as little cumberous as possible. On these occasions he always put up for the night at the nearest country inn. But in his travels in India he had frequently on the close of the day's labour to construct his own shelter for the night, or to pass it in the forest without any; as the writer of these remarks can testify, having had the honor to be his companion on one of his journies.

Kew was a favourite haunt at the period referred to, but his interest with Mr. Aiton the head gardener, was not always sufficient for obtaining specimens of plants for observation. Such was the principle of exclusion on which such Gardens were then conducted, that on one occasion he was induced to conceal a plant in his hat, that had been presented to him by one of the Foremen* not so much for the purpose of carrying it off successfully, as with the view of protecting the liberal benefactor who gave it him for examination, from the consequence of so great an offence. He used frequently to refer to this reminiscence with any thing but pleasure, and rejoiced heartily a few years ago when he perused Professor Lindley's report on Kew Gardens, in which it was proposed to throw them open to scientific men, as they now are, under the direction of an eminent botanist, Sir W. J. Hooker. A part of Professor Lindley's plan was to form a community of interest throughout all Botanical Gardens supported by the State, whether in England or the Colonies; and had Mr. Griffith been left a little longer in charge of the Botanic Garden of Calcutta, he would have contributed in effect to this proposal. At Kew, Mr. Griffith also made acquaintance with Mr. Bauer, the celebrated botanical artist and microscopic observer, a circumstance which probably contributed to his own excellence in these branches.

Early proofs of this excellence on the part of our late friend, are afforded by several of the illustrations in Professor Lindley's Introduction to Botany, which were introduced to that standard work, from the dissections and drawings of Mr. Griffith while yet a pupil.

He entered the medical service of the East India Company as an Assistant Surgeon on the Madras Establishment, 24th September 1832. The first place in which he was settled after arriving in India was Mergue, where he had medical charge of a detachment of Madras Troops.

His old taste for ornithology here returned, and in addition to his botanical recreations (or rather as he followed them, labours,) he also made a collection of birds. Happy perhaps for himself, and for science too, had he been allowed to follow his occupations undisturbed in the rich provinces of Tenasserim. The sincere friendships which he there formed with the authorities, and the exhaustless resources, and variety of occupations open to him in such a field, would have afforded ample scope for future eminence.

---

* Mr. Cunningham. This gentleman afterwards raised himself by his botanical acquirements to a distinguished place, and fell an early victim to botanical zeal in New Holland.

He was invited in 1835, to repair with all haste to Calcutta with a view of proceeding on a deputation to Assam, for which his services were supposed to be essential. From this period although a Madras Officer, he continued to serve under the Supreme Government of India in the Chief Presidency, Bengal.

After the performance of that service, and the return of the gentlemen to Calcutta with whom he was associated on deputation, he was retained in Assam at the recommendation of Capt. Jenkins, the Commissioner, for special service.

The disturbed state of the frontier, and the little that was known of the countries and tribes beyond it, induced the Commissioner to send him into the Mishmee mountains, only before visited by one European, and, who had occasion to make a precipitate retreat from the supposed treachery of the inhabitants. Mr. Griffith entered these mountains accompanied only by a single servant carrying a stock of provisions, and after remaining about six weeks, travelling alone unmolested over elevations of 8,000 feet and upwards, descended again into Assam visiting Bramakund, the highest known point of the great south-east branch of the Burrampooter, on his way back, bringing away extensive collections of plants, &c. and at the same time leaving a favourable impression behind him of the British character, which could not fail to have a beneficial effect on tribes with whom it was so little known.

It became necessary about this time to ascertain something of the political influence of the Burmese on the frontier, and to learn exactly how far the frequent interruptions of the peace of Upper Assam might be owing to such cause, as well as to collect as much local information as possible of the nature of the country between Burma and Assam.

With this view it was thought expedient that a conference should be held between the Burmese and British authorities on the frontier. Mr. Griffith joined the Political Agent of Upper Assam, and having reached the appointed place where they were to meet the Burmese authorities, and finding they had not arrived, the party after waiting a reasonable time returned to Assam.

Another arrangement was soon after entered into with the same view; an officer was sent round to Calcutta from Ava, whose knowledge of the Burmese character it was supposed would contribute to the success of the proposed object on our side, while another British officer, the late Dr. Bayfield, was to accompany the Burmese Commissioner.

Major White, the Political Agent in Upper Assam, and we believe Capt. Bigge, together with the officer who was sent round from Ava for the purpose, set out on a second attempt to meet the Burmese authorities, accompanied by Mr. Griffith. But unable to proceed beyond the frontier, in consequence of the reported difficulties and the unknown character of the country, the party returned to Assam, with the exception of Mr. Griffith.

He proceeded onward, accompanied only by a servant, having taken leave of the Assam authorities sometime in the month of February. (I forget the exact date.) Several months passed, and no account was heard of him. Vague reports of his assassination reached the public prints; the Government it was said having received full particulars. The revolution that broke out in Burma in the mean time, tended to confirm this, and his fate was considered hopeless. Some months after, when all hopes of him were abandoned, he reappeared in Calcutta about the middle of June entering my room without any previous notice, as if he had merely returned from a shooting excursion. He had just, in fact, arrived in a little schooner from Rangoon (in which by the way he was nearly lost at sea.) Without sitting down, I drove him at once to Government House, where I shall never forget the joy with which he was received by Mr. Colvin, the private secretary. It was only the day before when further concealment was thought unnecessary, that all particulars of his supposed assassination appeared in the daily papers as received from the political authorities in Upper Assam, two months before. After delivering the despatches of which he was the bearer from Col. Burney, the first that had been received from the British Residency at Ava for two months, he expressed a wish to withdraw, as the private secretary broke the seals. Mr. Colvin replied, that Lord Auckland would be most anxious to see him; he then referred to his dress as an excuse for being allowed to retire. But all rags as he certainly was, he was ushered into the presence of the Governor-General. On this enterprising journey which would have established the character of any man who had no other claim to distinction, he was exposed to many dangers, which proved his intrepidity of mind, as well as prudence of character.

It was sought on one occasion to deprive him of a boat, and thus interrupt his progress down the Irrawaddi towards Ava. Firmness was necessary, and matters went so far that guns were levelled both at him and his companion, Dr. Bayfield, who had been deputed from Ava to meet him.* At Ava he remained but a few days, when he was sent forward to Calcutta by the Resident, with despatches. Burma being still in a state of revolution, he descended the Irrawaddi in a canoe, to find his way to Calcutta as he best could under the difficult circumstances of the country. The canoe was so top-heavy with bulky collections of plants, that he afterwards said he ran equal risk of being upset, particularly in some of the more rapid parts of the river where swimming would be of little use, as he did of being shot, either as a spy, or, for the inducement to plunder which the size of his collections held out. Providence ordained that his valuable life should be a few years longer spared, to achieve further service to his country, and the cause of science.

---

* No one was ever more reserved in matters redounding to his own credit. I heard of this adventure from his friend Capt. M'Leod, who was afterwards Resident at Ava, and to whom the circumstance was no doubt officially known.

He thus accomplished not only whatever political object was expected from the Mission, but brought away with him in addition, extensive Botanical and Ornithological collections, and other information from regions never visited before, at least by any one capable of affording so good an account of them as himself.

His report of the results of this journey, no doubt an important document, has not been given to the public, although it contains scientific information, as we know every thing he wrote does. A severe fever seized him soon after his arrival in Calcutta, partly brought on by the exposure he underwent, and partly by over-application to his collections and report, which his eagerness to enter on some new enterprise, made him anxious to despatch as quickly as possible.

He was next directed to prepare for returning to Upper Assam, where his services had now become so distinguished. It was intimated to him that he should revisit the Mishmee Mountains, with a view to establish a friendly commercial intercourse with the natives, with whom his unassuming manner, no less than the unpretending nature of his pursuits, had given him much influence.

When on the eve of returning to Assam with these orders, and after having furnished himself with 1000 Rs. worth of presents suited to the taste of the people he was about to revisit, his destination was changed, and the presents were thus thrown upon his hands without any the slightest application for compensation on his part. I know his affairs to have suffered heavily by such delicacy, which however mistaken, formed nevertheless a generous ingredient in his public character. He was now appointed Surgeon to the Embassy about to be deputed to Bootan, under charge of Capt. Pemberton.

Instead of availing himself of the prolonged stay which this change would have enabled him to make at the presidency, he proceeded in advance of Capt. Pemberton on the 31st of July, about six weeks after his return from Burma. In that short period, notwithstanding a severe fever, he arranged and despatched to the Court of Directors extensive collections of plants, and furnished the Government with a full report of his late adventurous journey. His object in thus hastening his departure was in order that he might have an opportunity of revisiting the Khasyah mountains, the flora of which he had only cursorily examined before, at a wrong season. After accomplishing this object, while the embassy proceeded by the more tedious route up the Burrampooter, he crossed into Assam, and joined Capt. Pemberton at Goalpara.

The mission entered Bootan north of Gowahatti, and after penetrating about 80 miles into the mountains in that direction, it diverged to the westward, and returned to Bengal by the Buxa Doar, having traversed above 400 miles through the heart of Bootan. Mr. Griffith returned to Calcutta from this duty about the end of June 1839, and employed the next three months in the arrangement and despatch of his collections to the India House, an anxious and laborious duty which he had always after the close of a journey to perform, over and above the ordinary reports which officers employed on special service have usually to make. His reports were also from their nature, difficult and laborious. Yet such was his ardour in the pursuit of knowledge, and zeal in the service of the Government that, in November following he joined the army of the Indus, collecting objects of Natural History along the whole line of march, and availing himself of excursions northward to the confines of Toorkisthan. His collections of plants and animals of every description made on this occasion, as well as his route surveys, barometrical observations of heights, and accurate measurements of latitudes and longitudes, extended from the Indus to the banks of the Helmunt and the Oxus.

He messed when at Head Quarters with the Engineers, who each and all became sincerely attached to him. Of the friends he formed on the occasion, I may mention the late lamented Col. Sanders, and Lieut. Sturt; with the latter he resided when at Cabool.

In addition to the ordinary risks of such a campaign,* his pursuits frequently led him into danger. On one occasion returning about nightfall into camp, laden with plants he had collected during the day, he found himself intercepted by a party of Affghans who opened fire on him, one of their shots wounding a servant by his side. He was always armed, and providentially so on the present occasion. He returned the fire, which was kept up on both sides, and thus protected his defenceless party against large odds for sometime, until extricated by sepoys, who hearing shots came to his assistance. A bad fever he contracted in Affghanisthan obliged him to quit that country, which he did in safety about the beginning of 1841.

He then visited Simla and the Nerbudda, and returned to Calcutta in August, where he again arranged and despatched large collections to the India House, the result of his travels beyond the Indus. He was now appointed Civil Assist. Surgeon at Malacca.

---

* In all these he bore his part, even in the storming of Ghuznee for which he received a medal; and perhaps no officer in Affganisthan of his rank, suffered more severely than he did in the loss of camels and property.

With this he was satisfied, from the supposed facilities it would afford of extending his botanical and other knowledge, —all he ever thought of.

His friends however, considered him entitled to something better, but they knew it to be only a temporary arrangement until an opportunity offered for more suitable employment.

Unfortunately for himself, his opinions regarding the state of Affghanisthan, did not coincide with those of the higher political authorities. But he had good opportunities of judging for himself. He was vested with no authority, and his pursuits led him away from armed protection, and enabled him to see the real spirit of the people exhibited without restraint. Besides, it must be allowed that he had acquired great experience during the course of his former services, which no less than the known candour and honesty of his character, ought to have entitled even his political opinions to respect.

Nevertheless, the freedom with which he expressed sentiments in his Affghan report, at variance with those of persons in authority, is said to have been unfavourable to him; and on this account he was not considered entitled to that remuneration for his services in Affghanisthan, which he had been in the receipt of for several years before.*

Having addressed a memorial to the Honorable the Court of Directors, which was favourably supported by the Government of India, his claims were authorised; but he neglected to ask for interest and expense of life insurance which he had to pay to his agents, so that his arrears when he received them, were little more than sufficient to relieve him from the expenses in which his pursuits had involved him. He was however assured by Mr. Bird, then at the head of the

---

* The objectionable document was returned to him, and another report required in which political matters should be omitted. This was complied with. In the mean time the assassination of Sir A. Burnes took place, and proved that he had but too much ground for having given in his first report, prominent place to his opinions of the unsettled state of Affghanisthan.

Government of Bengal, that the terms in which the Honorable Court complied with his memorial, were of the most flattering description. Mr. Bird added, that as long as he had himself been in the service, he never knew an officer addressed in more complimentary terms than those of the Honorable Court, in granting the prayer of his memorial.

During the period of his travels in one part of the country, it was customary for him to have collectors employed in another. He usually attached to his person some intelligent native of the place in which he travelled.

The attachment of mountaineers to their home is proverbial, and on that account he never allowed them to accompany him beyond their native hills; but his connection with such faithful followers as he found amongst them did not end here. He generally retained their service afterwards as local agents or collectors of plants, &c. remitting to them the same regular salaries they received while he was amongst them, and they in return transmitting to him the results of their labour in the shape of collections. This connection, so creditable to the good faith and attachment of parties so differently circumstanced, in some cases lasted for many years, in others it is only now severed by his death.

Touching incidents of character might here be adduced, exhibiting the rude attachment of poor indigent natives of distant hill provinces to his person and his service. Occasionally they have even overcome their natural attachment to home so far as to visit him in Calcutta, where their dress, independence, and blunt affable manner, formed a striking contrast with the natives of Bengal. Previous to his departure for Malacca he made arrangements for the permanent employment of a native of the Khasyah hills, (Jumka, who had been retained there by himself as a collector since 1837,) by which his salary will in future be secured to him from the Botanic Garden. He also on the same occasion settled a pension of 2 Rupees a month, payable by his agents to the family of a poor man killed accidentally by the fall of a tree in the Botanic Gardens.* At Malacca he had two faithful collectors who, he continued up to the period of his death to support out of his private means, and it is gratifying to be able to state that they are in future to be continued as collectors on the establishment of the Botanic Garden. I need hardly advert to his works, because incompetent to afford more than a list; an analysis of them may be left to, and will doubtless be performed by abler hands at home, when the melancholy news of his premature death becomes known. They are as follows :—

1. On the Family of Rhizophoreæ. Trans. Med. and Phys. Soc. Calcutta, 1836, vol. viii.
2. Description of two genera of the Family of Hamamelideæ, two species of Podestemon, and one species of Kaulfussia. Asiatic Researches, vol. xix. 1836.
3. Journal of a Mission to Bootan, 1837-38, communicated from the office of the Pol. Secy. to Govt of India. Journal Asiatic Society, vol. viii. 208, 241.
4. Muscologia Itineris Assamici; or Description of Mosses collected during the journey of the Assam Deputation in the years 1835 and 1836. Proceedings of the Linnæan Soceity 1838, Calcutta Journal of Natural History, vol. ii. p. 465, vol. iii p. 56, p. 270.
5. Remarks on a collection of plants made at Sudyah, in Upper Assam, from April to September 1836. Journal of the Asiatic Society, vol. v. p. 806.
6. Some remarks on the development of Pollen. Journal Asiatic Society, vol. v. p. 732.
7. Description of Grasses which form part of the vegetation of the Jeels of the Sylhet Districts. Journal of the Asiatic Society, vol. v. p. 570.

---

* Having left no funds, I reget to state that the Agents on the announcement of his death, have discontinued this pension, which accounts for my becoming acquainted with the circumstance.

8. Journal of a visit to the Mishmee hills in Assam. Journal Asiatic Society, vol. vi. p. 325.

9. On the structure of ovula in two species of *Ephedra.*
Ditto, in some Orchideous plants.
Ditto, in *Callipeltes,* and *Galina.* Proc. Linnæan Society, 19 January 1841, No. xi p. 90.

10. Ditto on *Santalum* and *Osyris,* o. c. No. xiv. p. 121.
Ditto, in *Isoetes capsularis,* Roxb. showing the sporules or seeds to be produced from the division of a simple cell, or its contents, and that several sexual distinctions do not exist, as received by botanists, either in *Isoetes* or *Azolla.* l. c.

11. Report on the Tea Plant of Upper Assam. Transactions of the Agri-Horticultural Society of India, vol. v. Calcutta, 1838.

12. Extracts from a report on subjects connected with Affganisthan, communicated from the office of the Political Secretary to the Govt. of India. Journal Asiatic Society, vol. x. p. 797.

13. On some plants, mostly undescribed, in the H. C. Botanic Gardens, Calcutta. Cal. Journal Nat. Hist. vol. iv. p. 375.

14. Palms of British India. Cal. Journal Nat. Hist. vol. v. p. 1, 211, 245.

15. On Azolla and Salvinia. Cal. Journal Nat. Hist. vol. v. p. 229.

16. On some plants in the H. C. Botanic Gardens. Cal. Journal Nat. Hist. vol. v. p. 355.

17. On the development of the ovulum of *Santalum* and *Loranthus.* Transactions of the Linnæan Society, vol. xviii.

18. On the ovulum of Santalum, Osyris, Loranthus, and Viscum. Transactions of the Linnæan Society. vol. xix.

19. Some account of the Botanical collection brought by

Dr. Cantor, from the Eastward. Asiatic Researches, vol. xxi.

20. On the Black-dye plant of the Shans, and on the Gutta Percha, or Gutta Tuban. Journal of the Agri-Horticultural Society of India, vol. iii. p. 143.
21. An attempt to analyse Rhizantheæ, &c. Proceedings Linnæan Society, 1844.
22. On a few plants from Central India. Cal. Journal of Nat. Hist. vol. iii. p. 361

The works which he edited are——

23. *Hortus Suburbanus Calcuttensis*, a very important work by his late friend, Mr. J. Voigt, now in course of publication.
24. The Botanical Writings of the late Mr. Jack.
25. The Criptogamous Plants of the late Dr. Roxburgh, both in the Calcutta Journal of Natural History. vols. iv. and v.

The third and eighth paper in the foregoing list, relate as much to the people and statistics of Bootan, and the Mishmee Mountains, as to the Natural History of those little known regions. The same may be said of No. 12, which likewise contains much geographical information.

No. 4, and No. 14 are both elaborate papers; the one devoted to a description of the various kinds of Mosses, the other to the species of Palms belonging to India.

Prior to his researches, nothing whatever had been done towards a description of these two extensive sections of our Indian Flora, a dominion which he has thus appropriated to himself, and which will be awarded to him by contemporary and succeeding botanists.

Nos. 2, 5, 7, 13, 16, and 22, relate to his collections of plants, and to the description of some that were unknown before; but the general list of his collections, and of all the new forms which science owes to his zeal, have not yet been published.

Nos. 1, 6, 9, 10, 15, 17, 18, are for the most part elaborate papers relating to the highest and most philosophical questions in botany, for which the exuberance of vegetable growth and development, afford facilities of observation in India, never before taken advantage of to the same extent by any of his predecessors or cotemporaries. It will be for his friends in Europe to do justice to this portion of his labours.

Nos. 11, and 20, relate to economical subjects of great importance, namely the Tea plant of Assam, the plant producing Black-dye in the Tenasserim provinces, and the Gutta Percha. To appreciate the value of the first of these papers, it is necessary to remember, that all authorities up to the time at which it was published, regarded the Tea as a mountain plant, and to cultivate it successfully it was supposed to be necessary to remove it from Assam into the Himalaya. His report, on the contrary, proves as far as the means of exact comparison extends, a satifactory correspondence between the flora of Assam and that of the Tea districts of China. This, together with the fact of the embassies of Lords Macarney and Amherst, meeting with the Tea plants in China only when in boats on the great rivers, sufficiently established the identity of circumstances between Assam and the best Tea provinces of China. To him was due the successful formation of the Assam Company; for it is not to be supposed that the public would have subscribed to the cultivation of Tea in Assam, so long as the highest botanical authorities conceived the plant to be out of place in that province.

There were some points of resemblance between him and the late William Jack, with whose fate he displayed a deep sympathy, testified by the erection of an elegant monument in the Botanic Garden to his memory, which had been sanctioned twenty years ago, but only carried into effect during his brief superintendence.

Mr. Jack at a very early age attained great distinction, no less by his zeal than the depth and accuracy of his botanical observations. Mr. Griffith always regarded him as a Botanist of the very highest order, and frequently referred to his descriptions as autographs of his plants. Mr. Jack's descriptions are generally well executed elucidations of species, and limited groups. Mr. Griffith's unsettled occupations were unfavourable for this, as he was constantly drawn into new fields, and detached from libraries and means of working up parts in detail. Such facilities Mr. Jack happily in some degree possessed, as Surgeon to Sir Stamford Raffles. Mr. Griffith looked to a quiet residence at Malacca for doing much, and to an early retirement for doing all that he hoped to accomplish with his extensive materials.

Mr. Jack's views of botanical classification were regarded by Mr. Griffith as in advance of his age ; his own views we know to be so, as regards general classification ; and whoever attempts from his materials to do justice to him in this respect, should not be much behind him.

He had this advantage of most men who devote their chief attention to one pursuit. He was well acquainted with the condition of the other sciences, and generally well read in ancient and modern history and literature. He seldom travelled without his favourite authors on these subjects, to whom he referred with great enjoyment when fatigued by his botanical studies. He latterly took a great interest in Church history and theological writings, from his friendship with the Professors at Bishop's College, whose Library he had access to, during his residence at the Botanic Garden. Astronomy afforded him deep interest, and on his return to the Straits, he took a large and beautiful five feet achromatic telescope with him, in order to improve his recreations in this sublime department of knowledge. He never travelled without his sextant and surveying instruments when he could procure them, and no one knew better how to make use of them. This will confer an additional interest on his collections, since the exact position and altitude at which each plant was found, are accurately noted in his papers.

With the higher principles of Zoology, and the works of philosophical writers on that subject, he was well acquainted. One of the reforms he was anxious to introduce, was the uniformity of nomenclature, which he thought should be the same at least in Botany and Zoology. In this he set the example himself; but he aimed at still higher reforms in philosophical botany, suggested by the zoological works of Swainson and Macleay with which he was perfectly familiar. The doctrine of types, and circular affinities, occupied his attention long; and I know him to have been reconciled to a general distribution of the vegetable kingdom, on principles corresponding with those laid down by the zoologists above mentioned. He often regretted that botanists neglected to avail themselves of such sources of information as zoological works afford, particularly as he was deeply impressed with the force and importance of the many striking analogies that exist between the vegetable and animal kingdoms.

His extensive experience both in structural botany and the habits and distribution of plants, at his years, rendered him one of the most likely persons to accomplish some great step in the improvement of botanical, and general science. But it is enough on this occasion merely to adduce local incidents connected with his service in India.

He availed himself during his residence at Malacca, of every opportunity of extending his botanical knowledge of that Peninsula, and adjoining islands.

He visited Mount Ophir in company with Sir W. Norris, and was much delighted with the scenery, particularly with the change of vegetation observed in ascending the mountain.

In January last, on his return again to the Straits, only a month before his death, he visited Penang for the first time;

and in a letter dated 15th January, he observes that the change of vegetation is not so remarkable on the hill at Penang, as it is on Mount Ophir. "I got two new Rottangs," he observes, "and left a third behind." In the same letter, written six days after his arrival at Malacca, he says, "I have not yet set about anything; one of my botanical places is destroyed, so that I shan't get much, unless I go four or five miles. Moorhead (the medical officer, his predecessor, of whom he writes in high terms) leaves immediately, so that I shall be here alone; *n'importe*, I have more work at home than abroad."

"I hope soon," he continues "to set about the last part of the Palms; I see two other new ones among those brought by my collector! I hope to do a great deal here, the place has so many facilities for study." In a still more recent letter, dated 28th January, he continued to write in the same happy strain, without referring to any complaint, but Mrs. Griffith, writing at the same says, "that he had been complaining, but is now quite well again."

His next letter, dated 5th February, written on his deathbed, ran thus:—

"I write this by deputy, being seriously ill of Hepatitis; the attack has been very severe, and the treatment necessarily active, so that I am reduced to an extreme state of weakness; although my adviser does not despair still the issue is doubtful, and under this impression I commence a few lines to you on business. Mrs. Griffith (supposing the result of this illness to be fatal to me) will bring up with her all the collections at Malacca, and they being added to those at the Export Warehouse, and all having been previously cleaned and packed, I leave to you, to present to government for the Hon'ble Court of Directors, to be sent home without any delay.

"As you know the trouble I have taken with these collections, and the hopes I had of making them subservient to a general scientific Flora of India, I nead not press on you, how much I am interested in their proper disposal, and their being brought properly before the scientific public; and I would say the same regarding my drawings and manuscripts, which will also accompany my wife, should it so happen that I leave her."

After expressing with extraordinary tranquillity and depth of feeling, his wishes and cares regarding his amiable and accomplished lady, (to whom he was united only four months,) so soon to be cast into premature widowhood,* he next refers with the same exquisite sensibility to his sisters in England, whose loss is almost equally great. He then resumes the subject of his collections as if to guard as much as possible against any inconvenience his death might occasion to the public interest; and continues in his dying moments.—"Among the plants now with me at Malacca, the bundles of which are marked outside, 'Himalaya' and 'Lower Bengal,' there are very many which may be thrown away with great advantage, and for this reason," he adds with his usual humility and moderation, "Government would probably allow two or three mallies to be employed as before, in the Export Warehouse, for their proper preservation, &c."

And thus concludes, "In all the plans I have entrusted to your execution, I am confident your own feelings will prompt you to every exertion on my account. Asking God's blessing on you, and your wife, I bid you good bye."

"Thus far," continues Dr. Moorhead, five days afterwards on the 10th February 1845, "was written at Dr. Griffith's dictation, but I grieve to say the fatal result which was dreaded came to pass yesterday evening, Sunday the 9th February, at half-past seven o'clock." His only regret being, that his papers were not left in such order as he could have wished.

---

* Mr. Griffith, was united on the 21st September, 1844, to Miss Henderson, a connexion of his own, her sister having been married to his brother, Captian Griffith.

Thus he died as he lived, a devoted servant to the Government and the public interest, for which his last aspirations were offered up in sincere Christian piety. Perhaps there is no man of his day, whose loss will be more felt. Had he been spared a few years, he would assuredly have contributed largely to the advancement of human knowledge. For this object alone he laboured from his boyhood, and brought a degree of energy and of enterprise to his aid, which enabled him at the early age of 34 years to attain materials for a general Flora of India, collected by his own hand, and under his own personal observation, in almost every province of the empire, from the Straits to central Asia.

His experience certainly embraced every province in India presenting any peculiarity of vegetation, or of agriculture, and although he has left extensive collections and manuscripts, yet it is melancholy to contemplate the amount of important information, that has descended with him to an early tomb; information acquired under so many perils, with an aptitude and an energy, such as we cannot hope to see combined in one individual again. It was probably in this point of view no less than his power as a teacher that Sir H. Hardinge, in sentiments dictated by the best feelings of human nature when addressing the pupils of the Medical College on a recent occasion, referred to the death of Mr. Griffith as a public calamity.

To an accidental detention at Malacca, of his predecessor the officiating Medical officer, is due the requisite medical treatment which he received in his fatal illness. Dr. Wm. Moorhead writes,* that he complained on 31st January of an acute pain in the right side, which came on suddenly after an evening drive, for which he was immediately bled; this afforded some relief, but the following day the pain returned; he was again bled; which, together with the ordinary remedies, afforded but temporary relief. On the fourth day, an enlargement of the right side appeared; on the fifth, hectic fever came on, and the case was pronounced

---

* You may be interested in learning from me, his friend and medical adviser, some account of the disease which has taken away from us so valuable a friend, and from our profession so bright an ornament.

Up to about 10 days ago, he appeared perfectly well and to enjoy good health; on the 31st January, in the evening, he came to my house and asked my advice as he had been troubled during the afternoon with severe pain in the region of the liver, oppressed breathing, &c. I recommended free bleeding from the arm, leeching, purging &c. which was done, and afforded relief; but on the next morning, the symptoms though in a degree abated were still present. The local and general bleeding was again ordered, and had decided effect in subduing pain, relieving oppression of breathing, and reduced the pulse and temperature of the skin. Calomel with digitalis and tartar emetic, was given every three hours, and when leeching was no longer practicable, a large blister laid over the region of the liver. Still, though the pain in the region of the liver was very slight, the pulse continued quick, the skin became again hot, countenance heavy, and altogether there were sufficient grounds for anxiety as to the issue. The speedy action of the mercury on the constitution was now the only resource left, and it was accordingly administered every two hours, and without other medicine. To my great grief and disappointment, 4 days passed without any of the wished for signs appearing, and on the 5th day I relinquished its use, being convinced from previous experience, that further perseverance would only be prejudicial. Hectic symptoms now presented themselves, soon followed by cold clammy sweats, and other indelible signs of the worst having happened. He retained his senses until about five hours before his death, and as you will learn made all his arrangements clearly for the disposal of his affairs, his collections, &c. These are of course for the present in the hands of the Commanding Officer and a Military Committee. His poor widow (who is as well as can be expected,) is now staying at the Resident's, Mr. Lushington, she will take the earliest opportunity of proceeding to Calcutta, and I heard her husband give her instructions, should her funds fall short of the amount of passage money, she was to draw a bill on you to make up the deficiency.

I should let you know what the Autopsy disclosed;—all the marks of recent acute inflammation of the liver; all the dorsal portion of the right lobe softened, and in the midst of this a small abscess containing about an oz. of apparently freshly formed pus; but it was in the colon that I found the most extensive organic changes, and for which nothing that I had seen in this illness, or ever heard from my poor friend, had prepared me; throughout its whole length it was thickly studded with ulcers mostly about the size of a *6d.* piece, and evidently of long standing; the cæcum was very much disorganized, its coats had become nearly ½ an inch thick, the mucous coat one sheet of ulceration; pus infiltrated between the different coats, and the external firmly adhering to the penitancæum on the parietes of the abdomen.

I write this only a few hours after the occurrence of the melancholy event, and consequently in much confusion; but I have reason to know what interest you will feel in every thing connected with the loss of so valuable a life. I beg to assure you that I am yours respectfully,

W. Moorhead.
Asst. Surgeon, Madras Army.

February 10th, 1845.

hopeless. He himself had little hope of recovery from the beginning. He retained all his faculties to within a few hours of his death, on the 9th February. He displayed on that melancholy occasion, as he did throughout life, great fortitude and resignation, disposing as above detailed of all his collections, and MSS. according to what he conceived to be, the interest of science.

In person he was of middle size, and strong compact frame. His countenance was prepossessing, and bore the stamp of intellect, which was confirmed by a decided manner, and unassuming address.

When I first met him about ten years ago, his appearance was very youthful, and his spirit unclouded and excessively cheerful. But the privations and cares to which he was incessantly exposed for seven years afterwards, told upon his looks, which became prematurely aged.

The expense and encumbrance of collections, and anxiety for their safety in his unsettled state, were very painful to him. On coming to Calcutta, he left large collections behind at Malacca to save the expense of freight in bringing them with him, under the chance of returning again to the Straits. On his recent return from Calcutta to the Straits, he also left large collections behind him, for the same reason. So also during his different journies, large collections of plants were always left at expense in Calcutta. With these it was necessary to leave an establishment for their proper care, as the parcels required to be kept open, in order to preserve their contents from damp and insects. All this, as may be supposed, was a source of deep anxiety to him, as much care was requisite not to injure the specimens, or displace the labels. I mention this particularly in order to show what a heavy tax upon his time and means his collections were. To them he looked as the means by which he should have to discharge all his higher duties, and render the results of his travels permanently useful.

Writing from Culpee 15th Dec. 1844, on board the "Victoria," three days after his recent departure from Calcutta, he observes, "The only things I am now anxious about, are the collections at the Export Warehouse; I should much wish to have some check on Roopchaund who is left in charge. Perhaps Mr. Grant could manage to have him report himself every day coming and going, to one of the subordinates; and if you could drop in occasionally and note what is doing, I could soon see whether it is worth while risking their being damaged by leaving them behind." The collection in question consists of a series without duplicates of all the plants he collected, amounting to no less than seven or eight thousand species, each carefully labelled. Their value to him was incalculable, and the pain at being still unsettled, and compelled from the limited emoluments of his situation to leave them behind, was very intense.

His extensive scientific correspondence and numerous dawk bangy and other parcels of seeds, plants and books from all parts of India and from Europe, also entailed expense, which the small pay of an Assistant Surgeon to which he was reduced at Malacca, could ill afford him to meet, in addition to the other expenses of his collections and pursuits. In December and January last, two months when his parcels and letters came to my house, their freight and postage amounted to 150 or 200 Rs., a tax upon the eminence he atained, from which there was no way of escaping. I mention this, in hopes that his distinguished merits as a public servant, may commend his widow and family to the clemency and consideration of the Government of India, to whose service he was so bright an ornament, and to that of the Honorable the Court of Directors, to whom he has bequeathed all his collections of Natural History as well as manuscripts and drawings.

An application from the distinguished persons in Europe to whom he was known, might promote this object. Professor Von Martius of Munich, and Professor Lindley, Sir W. Jackson Hooker, Mr. Brown, Mr. R. H. Solly and Dr. Horsfield, are those with whom he corresponded on terms of affectionate cordiality.

The candour and simplicity with which he always expressed his real opinion in matters which he conceived in any way affecting the interest of society or of science, at one time involved him in differences quite foreign to his nature. But his artless disposition, and sincerity of heart and speech, were amongst the greatest charms of his character. He was himself scrupulous even perhaps to a fault, in matters connected with the public interests, and he seemed to expect the same from all those with whom he was connected in the discharge of his duty. To this cause was due many observations in his writings which might otherwise be attributed to personal motives, from which no man was more exempt. There never was a man whose life and service exhibited more of a generous devotion to the public interests altogether incompatible with selfish objects, nor was ever any one more capable of appreciating, or ready to acknowledge a generous action on the part of others.

To the sufferings and wants of his fellow creatures he was also keenly alive, and ever ready to contribute to their relief. To the Catholic orphan children (perhaps the greatest objects of charity to be met with, from the indigence of the class to which they belong,) he regularly contributed a small sum monthly, and no object of distress was brought to his notice during his residence in Calcutta, that he did not privately contribute to relieve.

His private virtues may be summed up in a few words—he was an affectionate husband, and brother; an ever faithful and sincere friend; and eminently consistent and exact in all his engagements.

In his diet he was remarkably sparing, and for some years prior to his death, he abstained from wines, which he observed unfitted him for study; and his personal expenses for mere living as regarded himself were very trifling.

He had no fixed distribution of time; he retired early to rest and rose early. He always, when time permitted, availed himself of a morning walk at daybreak for an hour, the rest of the morning he devoted to business, answering letters received the day before, in which he was generally very exact. The rest of the day, unless interrupted, was devoted to the examination and dissection of plants under the microscope, drawing and describing all peculiarities presented.

The evenings were devoted to general reading, which he also had recourse to when indisposed to work. But he was never idle; and during the ten years I have known him, his industry and occupations continued unchanged. Even on his death bed, his microscope stood beside him with the unfinished drawings and papers and dissections of plants on which he was engaged the day on which the fatal symptoms of his disorder came on. Such were the constancy of his efforts to the last.

His endurance of study and application at the microscope was surprising. I have known him persevere for days and weeks together, in order to overcome some difficult point regarding which he felt anxious. If a difficulty proved too much at one time, he would put the subject aside without coming to any opinion, and take it up again on a more favourable opportunity; never losing sight of the object, without dwelling on it fruitlessly. He was fond of society, but disliked to go out to it, and unlike most men of studious habits, he never seemed impatient of interruption, but on the contrary was always ready to enter into light jocular or other conversation however he might be employed. Of his pursuits he seldom spoke, and disliked to be questioned much on the subject, not from any reserve or desire to make a mystery of the matter, for his papers lay carelessly about on all sides, but because he seemed desirous of availing himself of other subjects of conversation when he could.

In Microscopes he took a great interest, and was familiar with the relative merits of all the celebrated makers; Ross of London was his favourite.

His friend Mr. G[illegible]nt obtained the best that could be had at various times from continental makers, with the view of comparing them with Ross's, and when obliged on such occasions to confess the superiority of the fine movements and the transparency of the higher powers of the London microscope, Mr. Griffith's countenance invariably exhibited a triumphant expression in favour of British workmanship, highly characteristic of his patriotic sentiments in all things.

He formerly used the simple microscope with triplet lens for his dissections, because it was preferred by Mr. Brown the great English botanist. Latterly the nature of his researches on the development of the ovula in plants, rendered the highest powers of Ross's most improved compound microscope necessary.

His first and only patron and steady friend throughout life, was Richard Horseman Solly, Esq. who had the merit of being the first to discover his genius for botanical and microscopical research. He regarded the interest taken by this gentleman in his early efforts with peculiar gratitude, which he remembered to the last, bequeathing his microscopes to him in his Will. The results of his labours in the higher walks of botanical science were freely transmitted to Mr. Solly, to make any use he chose of them. Mr. Solly always brought them before the Linnæan Society, in whose Proceedings and Transactions they have successively appeared, and are still appearing, some being now in course of publication. He never allowed his confidence in a friend to be shaken of whose consistency and judgment he had once formed a favourable opinion. In Botany there were few whose observations he confided in, but his more important papers were generally submitted to Mr. Brown, whose opinion was law to him.

I have known papers that occupied him for years to have been sent home to Mr. Solly and eighteen months or two years elapse without hearing of them. He would then perhaps, beginning to despair, remark with the most perfect resignation, that Mr. Brown may be dissatisfied. Such was his remark regarding the paper on the Ovulum in the 19th vol. of Transactions, Linnæan Society, though it will place Mr. Griffith on a level with the first physiologists of Germany. Since his death, the part of the Transactions in question containing this paper has arrived at Calcutta. It chiefly consists of a continuation of his attempts to trace the changes in the ovulum from the period of fœcundation to the development of the new individual; this profound subject being beautifully illustrated by his pencil and his pen. The proceedings of the same Society for the past year also arrived by the same opportunity, shewing Mr. Griffith to have occupied the attention of that learned body for three successive evenings, while his papers on Root Parasites and other subjects of high interest were read. So that we have not had him all to ourselves in Calcutta during the past two years, however the extent of his labours among us may have led to such a supposition.

But the discovery of these additional proofs of his zeal and talents, only renders us more sensible to the loss we have sustained by his premature death.

12th March, 1845.

The foregoing remarks, though kindly designated a memoir in the proceedings of the Society which have taken place on the melancholy occasion, were only intended to furnish such particulars as, in justice to his memory should be made known with as little delay as possible. The memoir of such a man should not be attempted hastily, and should be carefully drawn up from authentic documents, and other sources of exact information. His exertions have been extended over so many different parts of India that it would be impossible for an individual in one place to supply a faithful detail of them. Many of the circumstances adverted to may possibly be incorrectly, while most of them are insufficiently stated. I would therefore hope that some of the numerous sincere friends he has left throughout the country would kindly correct any errors into which I may have fallen regarding particular instances of his service, and supply other particulars regarding them which I may have omitted. Notices made with this view will doubtless find ready insertion in the public Journals, and more particularly in that of the Agri-Horticultural Society. Should any such communications (not of sufficient importance for separate publication,) be entrusted to me, I will carefully preserve them with the view of contributing at some future period, towards a memoir more worthy of the subject than the present imperfect sketch.

J. M'CLELLAND.

Notes.

Privations and Dangers to which his Pursuits exposed him.

First Para. Page 7.—On one occasion during our journey to Assam, night overtook us, and we had to spend it in the forest without shelter.

On another occasion, making an excursion from Gabrew Purbu, one of the tea localities in Assam, into the adjoining Naga mountains, night overtook us in a forest; the weather was threatening, and we had just time to cut down a few branches for shelter when a storm of thunder and rain came on, such as is only experienced in the Terrai. The storm lasted for three days without intermission. We were 20 miles beyond the British boundary, in a country inhabited by one of the most hostile tribes of Natives on the frontier, whose observation we hoped to elude; but notwithstanding the deserted character of the place, and the torrents of rain which continued to fall, a crowd of Nagas armed with spears, appeared at day-break on an eminence within a hundred yards of us. The tribe were notorious for their depredations on the outposts of the Assam Light Infantry, occasionally decapitating at night, whole guards as they lay asleep. But we were in a rich botanical locality, and the thunder and rain and hostile natives had no effect in repressing his botanical ardour, which he indulged without shelter, under a continued storm of rain and thunder for three days.

In his journey alone into the Mishmee mountains, during six weeks he could have had no shelter except when admitted into native huts, not always met with, nor often accessible to the stranger. On the journey also performed alone from Assam into Burma, a great portion of the intermediate tract was quite uninhabited; there, he could have had no shelter for two or three months. Nor could he have had much in his canoe for three weeks or a month when descending the Irrawaddy. On these occasions, he relied chiefly on a thick cloak. For food he relied upon yams, and whatever he could shoot.

In warm seasons and climates, his day's journey was usually over by nine o'clock; and, after a hasty breakfast, the labour of the lay would commence with an examination of the plants collected during the morning, while his people were employed in drying collections. In mountain countries he breakfasted at day-break, the difficulties of travelling and diversity of objects met with to occasion delay, rendering any other meal uncertain.

The nature of his pursuits, (which required that his journies should be performed on foot,) constantly led him into jungles where marks of tigers and other wild animals would have deterred any one less accustomed than himself to danger, or less ardent in the pursuit of knowledge from entering. He always preferred when prosecuting his enquiries, the bed of some dark rivulet overhung with forest, and canopies of climbers, to an open road, even though compelled to wade, as I have often known him for days, knee-deep in water. To such exposure of his valuable life and health are due, the riches and value of his collections.

His Zeal.

In the Botanic Garden, during his superintendence, rude ladders may have been observed leaning on certain trees on which any peculiar flowers appeared; these were to enable him at stated intervals to inspect the changes taking place in the inflorescence and fructification, fresh portions of which were daily found upon his table, and under his microscope. So anxious was he to take advantage of the rare plants constantly coming into flower in the Botanic Garden, and which never before had been investigated, that as the brief period of his superintendence drew towards a close, he postponed every other duty to attend to them; and when eventually displaced from the Garden by the return of Dr. Wallich, he applied for six months' leave, ostensibly on private affairs, but really to enable him to dispose of heavy arrears of public engagements, which had accumulated on his hands; such as the arrangement and dispatch of collections to the Court of Directors, the printing of Dr. Voigt's "Hortus Suburbanus," &c. &c. On his death-bed he regretted that his papers were not in better order, and expressed a hope that Mrs. Griffith would be able to assist in their publication, as also his sister Miss Griffith, whose great ability in drawing, might aid in preparing the plates for the press. The publication of his vast collections, is a work in which the very general co-operation of botanists would be nobly bestowed.

Honours conferred upon him.

The following are the copies of the Calcutta Journal of Natural History, alluded to in the resolution of the Society, now at its disposal, to raise a fund for the publication of his MSS. Vol. I, 56 copies; vol. II, 196 ditto; vol. III, 151 ditto; vol. IV, 196 ditto; vol. V, 213 ditto. These are the only complete sets, now I believe on sale.

Besides the Horticultural, and several other English Societies of which he was spontaneously elected corresponding member—honorary distinctions conferred without application on his part, or the payment of any fees—he was in the same manner appointed in 1840, a member of the Imperial Academy at Bonn. The following year a similar honor was conferred upon him by the Royal Botanical Society of Ratisbon; and in 1844, the Royal Academy of Sciences at Turin, conferred a like honor upon him. In his case such distinctions were no less creditable to the learned Societies from which they emanated, than they were to the individual on whom they were conferred.

It is intended, (I have been given to understand,) to erect a Mural Tablet to his memory either in the great theatre of the Medical College, or in the apartment assigned through his exertions to the purposes of a Botanical Museum. In thus commemorating his connection with the Medical College, the Council of Public Instruction hold up a bright example to the Students, which ought to exercise a beneficial influence on their minds. Having been asked for an inscription for the proposed tablet, the following was suggested, which I believe met the approbation of Dr. Mouat. It is said in a recent report of the Council of Education, that it was Mr. Griffith's intention had he been spared, to have published a Botanical Manual for the medical Students. This, in fact, was the first thing he proposed to do on taking charge of his class in 1842, but before entering on the task, he was requested to supply an estimate of the expense, about 1,500 Rs. The sum was however thought too much, and he was thus reluctantly obliged to abandon the object for the time.

TO THE MEMORY

OF WILLIAM GRIFFITH, ESQ. F.L.S. ETC.

Madras Medical Service, Born at Ham in the county of Surry
March, 1810.

AS PROFESSOR OF BOTANY IN THIS COLLEGE

HE WAS DISTINGUISHED BY THE ZEAL AND ACTIVITY

WITH WHICH HE IMPARTED THE KNOWLEDGE

HE HAD HIMSELF ACQUIRED BY PERSONAL INVESTIGATION

IN THE DIFFERENT PROVINCES OF BRITISH INDIA, AND IN THE NEIGHBOURING KINGDOMS

FROM THE BANKS OF THE HELMUNT AND OXUS

TO THE STRAITS OF MALACCA

WHERE, IN THE CAPACITY OF CIVIL ASSISTANT SURGEON

HE DIED 9TH FEB. 1845, IN THE 34TH YEAR OF HIS AGE,

AND THE 13TH YEAR OF HIS PUBLIC SERVICE IN INDIA.

HIS EARLY LOSS IS DEEPLY DEPLORED BY THE HEAD OF THE GOVERNMENT OF INDIA, AND BY THE LEADING NATURAL HISTORIANS OF HIS TIME.

HE BEQUEATHED LARGE COLLECTIONS OF PLANTS AND MSS.

TO THE HONORABLE THE COURT OF DIRECTORS OF THE EAST INDIA COMPANY.

In addition to the erection of the proposed Tablet, I would suggest that the important Botanical diagrams illustrative of the structure of the various orders and families of plants, which he presented to the College for the use of the Students, be lithographed to the extent of 50 or 100 copies at least for distribution to other Schools and Colleges throughout the country, in which Botanical science is, or may be taught in India. And further, that a few sets be transmitted to the Hon'ble the Court of Directors, for distribution if necessary throughout the Botanical schools and institutions of Great Britain and Ireland. This would be no more than an act of justice, particularly as regards such of these diagrams as are the result of his own dissections and drawings, as the greater part of them are.

For a plain marble Tomb to be erected at Malacca by his brother Captain Griffith, and a few of his own most intimate personal friends, the following inscription is proposed :—

GULIELMUS GRIFFITH,

Societ. Linn. Lond. Soc.; Acad. Cæs. Nat. Cur. Bon.; Soc. Reg. Bot. Ratisb.; Acad. Reg. Scien. Turin. Socius. etc.

VIR MAGNI INGENII AC INDUSTRIÆ

NATURALIBUS SCIENTIIS PROMOVENDIS TOTUS INCUMBENS

PLURIMAS INDIÆ BRITANNICÆ PROVINCIAS

NEC NON REGIONES BURMANICAS AFGHANISTANICAS BOOTANICAS

SUMMO STUDIO ET LABORE PERÆGRAVIT

MISHMEOS, KASYAOS, HIMALAYAOSQUE MONTES PERLUSTRAVIT.

QUÆ IPSE MAGNA DILIGENTIA ET SOLERTIA COGNOVERAT

VOCE AC SCRIPTIS ILLUSTRAVIT.

CUM BOTANICÆ PROFESSORIS PARTES CALCUTTÆ PER BIENNIUM PARTES EGISSET,

VIRIS DOCTISSIMIS IN HONORE HABITUS, AMICIS APPRIME CHARUS,

MALACCÆ MEDICI CIVILIS OFFICIO FUNGENS

OBIIT DIE 9 FEB. A. D. 1845 ÆTATIS SUÆ 34.

The friends who have been invited to join in this mark of respect to his remains, are Sir W. Norris, J. W. Grant, Esq. C. S., D. F. McLeod, Esq. C. S., J. F. Cathcart Esq. C. S., Major Jenkins, Commissioner of Assam, Capt. Durand, Commissioner of the Tenaserim Provinces, Robt. Wight, Esq. Superintending Surgeon Madras Service, J. C. Marshman, Esq., H. M. Low, Esq., Willis Earle, Esq., W. Ridsdale, Esq., W. M. Westermann, Esq., J. W. Masters, Esq., Dr. Cantor, and J. M'Clelland.

He was appointed Superintendent of the Botanic Garden in August 1842 by Mr. Bird, and it is but just to his friends, Messrs. J. W. Grant and J. C. Marshman, to say they interested themselves much in his favour, which was the more necessary, as his distance from Calcutta at the time, and the urgency of the occasion seemed together with other interests to preclude his appointment. This difficulty was however removed by the nomination of Mr. Marshman's brother-in-law the late Mr. Voigt, a learned botanist on the spot, to the charge of the Garden until the arrival of Mr. Griffith from Malacca.

This arrangement took all parties interested in it by surprise; and the result reflects the highest honour on those who brought it about. For it not only afforded Mr. Griffith an opportunity of becoming known and appreciated in Calcutta for his amiable character, and high personal qualities which had been here greatly misunderstood, but in addition to his other exertions it enabled him to carry through the press in a superior manner, the *Hortus Suburbanus Calcuttensis* (all but the Index) the important posthumous work of his late friend, Mr. Voigt.

His reputation as a Practical Scientific Gardener.

The estimation in which he stood in Europe as a practical man, may be gathered from the nature and extent of his correspondence. Letters of the most eminent botanists, both at home and abroad, which have reached India for him by the last two mails, and which his lamented death has thrown into my hands, afford some insight to this.

The first is from Mr. Ward, an eminent horticulturist and practical botanist, whose invention of air-tight cases for the transmission of plants, has already conferred the most important services on society, from the security with which an interchange of plants may be effected by this means between the most distant parts of the world. Mr. Ward, it is to be remarked, was his fellow student, not only in University College, but in the Nursery's Gardens in and about London, where it ought to have been stated in the preceding sketch, he spent his time for years, and laid the first foundation of his botanical knowledge. Mr. Ward's letter is dated London 30th November, 1844.

"I am sure there is no one in India but yourself, who would, or could do justice to the Botanic Garden, and to the increasing calls and wants of science. The researches of Liebig and others have opened such an enlarged field of research, and that of the most interesting kind as connected with the physiology of vegetation, that a *well prepared* mind alone can fully carry out such investigations. These, however, you will carry out at Malacca, in the garden of nature; although not perhaps with the same success as where you have the power of assorting your tribes together. I have to thank you most heartily for your contributions to my herbarium; you cannot conceive the delight they have conferred upon me in many a weary and painful hour, my only regret being this, I cannot pay you in kind, &c."

The next token of his skill as a practical gardener, to which I would allude, is afforded by the Horticultural Society of England, which referred to his personal experience and special investigation, certain points connected with acclimating the plantain, and certain other fruit trees in England. The communication adverted to, he received only in December last, and was taken with him to Malacca, there to follow out its objects, and where it will be found amongst his papers. It will form a suitable article for a future number of the Society's Journal, when the Horticultural Society of England will doubtless be gratified to find any practical gardener or botanist in Bengal, to supply the requisite desiderata. I am particular on this point, because science and practice are sometimes, though falsely supposed to be incompatible, particularly when it is sought to detract from the value of the former.

His reputation as a Practical Botanist.

The next letter is from Sir William Hooker, Director of Kew Gardens, dated Oct. 29, 1844. " I shall be glad to hear if you can give me any hope of your coming to England. I would be your guide in Kew Gardens, for you would not recognise them again; you shall look through my plants and select *ad libitum* as Hervey has done, who has taken away 5400 *species* for the Dublin University, without sensibly diminishing my packets. It will be more difficult to make your selection, because you desire plants to illustrate genera, or the species of Northern India, and I should almost despair of its being done satisfactorily, except by yourself. For yourself, I cannot but think you will soon be back to Calcutta, where you will carry out your improvements, &c."

Sir William then enters into critical botanical details, shewing the confidence with which he regarded Mr. Griffith's judgment as a Practical Botanist.

The next letter is from Professor Von Martius, it is dated, Munich, 6th January, 1845.

" I do not know whether you have received the last books I sent you, they shall be followed with the Parts of the *Flora Brassiliensis* as they are published. The work goes on slowly; but after the completion of my Palms, I shall have no interruption.

" Your collections will contribute much to the value of my History of Palms. I have examined your excellent work on Indian Palms with much interest, and with the aid of the specimens when they arrive, I will be able to make them all out. In the mean time I have printed the *Genus Phœnix*, and I transcribe and forward herewith a synopsis of the Indian ones, and should be happy if you could turn the communication to account.

" In September last I had the pleasure of seeing Mr. Robert Brown here. He remained with me a month at Munich, where he assisted at the meeting of the German Agriculturists in the Bavarian Alps. He was in high spirits, and we went over all the leading chapters of our science together; every where he evinced a familiarity with facts and structure quite surprising, indicating what is to be done, and where improvement is to be expected. *He agrees with me in appreciating your spirited and enlightened investigations, and I now more than ever, look forward with you to confidence as his successor—as the standard English botanist.* I have been for some time past expecting a collection of Brazilian plants, directed to be made for me by the Emperor; when they arrive I shall despatch a portion of them to you. You tell me that Mr. Wallich has resumed charge of the Gardens, but you do not say whether your occupations will keep you in Calcutta, or where I am to direct my letters in future. On these points be so good as to inform me in your next letter, which I shall be anxiously looking forward to, &c."

His Character as an Indian Botanist.

The next letter, is written after the news of his death, by Dr. Wight, Superintending Surgeon Madras service, Author of the "Prodromus Floræ Peninsulæ Indiæ Orientalis," "Illustrations of Indian Botany, Icones Plantarum," &c.

It is dated Coimboitore, 25th March, 1845.

"I have also been thinking what could be done towards the preservation of his valuable notes and MSS. the result of so much labour and deep reflection on vegetable structure and affinities, &c. I have thought to no purpose for want of data, I shall therefore look forward with much anxiety for your promised letter, which will, I hope, put me in possession of some information on which at least to ground a suggestion, should I be unable to do more than offer one. In the meantime I may as well mention that, should circumstances so turn out, that you think I can be of any use, my services are at your disposal. It certainly seems most desirable that steps should be taken to preserve such invaluable records of most untiring industry, guided by transcendent talents; and I as yet see no better way of doing so, than by at once collecting and arranging them for immediate publication. To aid in such a work, would be to me a labour of love towards my late inestimable friend, and I should gladly assist in it to the extent of my imperfect acquaintance with the deep workings of his mind. To do them justice will be no easy matter I am well aware, for even in the present advanced state of botanical science, he was far ahead of his generation; but an imperfect record would be still better than none. Even with all its imperfections, such a work would do much towards preserving his memory, and stamping him as one of the most able and industrious men of his age. But enough for the present, as all these points can be better discussed when we know what were his wishes regarding them."

Mr. Gardner, the Superintendent of the Royal Botanic Garden at Ceylon, writes.

"It was with extreme sorrow that I heard of the death of poor Mr. Griffith; although personally unknown to me, I have long been an admirer of his rich talents and highly philosophical mind. His career has indeed been short, but he has left a name, and a fame behind him which but few can attain to, even with patriarchal years. India has never had such a botanist on her shores, and I fear it will be long ere such another makes his appearance."

Mr. Jameson, Superintendent of the Botanic Gardens, North West Provinces, writes.

"I learn from the papers the melancholy death of poor Mr. Griffith; in him the Government have lost one of the brightest ornaments of the Service. By his intrinsic worth alone he placed himself in the most prominent, and distinguished position in the scientific world." &c.

The Claims of his Family.

During the period* of his service in India, nearly 13 years, he was employed in a strictly botanical capacity, only about 2½ years; namely, when a Member of the Assam deputation, and when officiating at the Botanic Garden. His subsequent employment in Assam, in the Mishmee Mountains, in Burma, and in Affganisthan, had as much of political, as of botanical or scientific object. His original employment in the Tenaserim Provinces, as well as his employment with the mission of Major Pembertom to Bootan, and his late employment in the Straits, was in his medical capacity.

With regard to his allowances at Malacca, they were very small, the smallest an officer of his length of service could have, while the nature of his pursuits was incompatible both with private medical practice and with trade, by means of which medical officers on small pay occasionally augment their income. On the other hand, the expences of his pursuits swallowed all his pay, so that I know him on this account to have denied himself many personal conveniences to which he had been accustomed, and which were essential to a man of his engagements, rather than incur debt of which he had a just dread.

Thus, no servant of the East India Company possessing such a reputation, ever accomplished so much as he has done at so little expence to the State.

If, as I think we must allow, the highest object of human life, so far at least as the general interests of Society are concerned, is to unfold to the understanding the hidden mysteries, the harmonies, and resources of nature, on the right comprehension and use of which, social order and improvement depend; few men will be found to have contributed more to the dignity of our nature, and the good of his fellow creatures, than Mr. Griffith.

Considering the humble means at his disposal, and the benevolence and generosity of his disposition, there cannot be a doubt that the immense materials he accumulated for the advancement of knowledge, were collected and brought together at the expence of his family, to whom he would otherwise have contributed the pecuniary means he devoted to his pursuits.

Hence we would very earnestly commend the helpless portion of his family, the Infant, the Widow, and the three Maiden Sisters whose hopes were centred in him, to the generosity and care of those to whom the destinies of India are entrusted. If ever they had a faithful servant, devoted to their interest, and to the advancement of science, and of civilization, in the nations which they govern, it was William Griffith.

He has given a tone to scientific inquiry in India, and a character to the public service, which cannot fail to inspire a favourable impression of the East India Company's Government, in the minds of scientific men in all parts of the world, while he has set a bright example to those of India.

Correspondence connected with the supposed discovery of a Teak Forest on the banks of the Koladyne river, in Arracan.

(Communicated by the Government of Bengal.)

To J. Hume, *Esq. Honorary Secretary, Agricultural and Horticultural Society.*

Revenue.

Sir,—With reference to your letter dated the 16th November last, I have the honour to transmit the accompanying copy of a letter No. 6, from the Commissioner of Arracan, dated the 30th November last, with enclosures, on the subject of Teak Forests in that Province.

I have, &c.
Cecil Beadon.
Under Secy. to the Govt. of Bengal.

Fort William, 29th Jan. 1845.

To the Secretary to the Government of Bengal, Home Department, Fort William.

Sir,—It having been strongly insisted upon, within the last few months, that an extensive and heretofore unknown forest of Teak wood existed at a place on the banks of the Koladyne, about 100 miles up that river from Akyab, from whence a very superior log of Teak was presented to me by Mr. W. D. Brown, merchant of this place, I lately deemed it expedient to depute Lieut. Hopkinson, Junior Assistant Commissioner, to investigate the matter in the hope that a valuable discovery had really been made, and I would have transmitted his report at a much earlier period, had I not been in expectation of receiving a somewhat similar document from Capt. Phayre, with reference to the existence of Teak trees in the Sandoway district, and also a report through Colonel Irvine, C. B. Superintendent of Marine, upon the quality of some of the specimens of the wood which I sometime since forwarded to Calcutta, which might enable me to dispose of the subject in a complete manner.

2. I have now the honour to submit herewith copies of the documents noted in the margin,* and I much regret that the results of my Assistant's enquiries should have proved so little satisfactory. So far from a new forest having been discovered as I most earnestly hoped, it appears from Lieut. Hopkinson's report, that the site of the trees shewn to him is identical with that known to myself and Assistants, years ago, and that the trees to which we attached little importance because of the paucity of any of good size, and the almost insuperable difficulties opposed to their removal, are neither larger nor more abundant than was supposed, while the difficulties of getting at them may be imagined from the fact that even in September, Lieutenant Hopkinson had to quit his boat six days below the spot, and proceed up in a covered canoe, and when he got there he had to scramble over hills and rocks, which he could only traverse in safety bare footed, and availing himself of every twig and branch, and an iron shod stick as a support. In short, from his description of the locality it is unfortunately but too manifest, that whatever quantity of Teak there may be in the mountains through which the Koladyne flows, they cannot be removed except at an expense which would render the speculation wholly unprofitable.

3. This is the more to be regretted as it appears from the annexed report of the H. C. Marine Surveyor, and ship builder, on specimens sent by me to Calcutta, and for which report I am indebted to the kindness of Colonel Irvine, C. B., that the wood is really of very excellent quality.†

---

* Junior Assistant to Commissioner, dated 8th October, 1844.
Captain Phayre to Commissioner, dated 1st Noverber, 1844.
Mr. Simpson to Col. Irvine, C. B., dated 2nd November, 1844.

† A report by Capt. Goodwyn on the quality of a piece of Arracan teak, forwarded by Major Bogle to the Society, will be found in vol. III, page 218.—Eds.

4. Of the red Jarool alluded to by Mr. Simpson, there is a great abundance in Arracan, as indeed there is of several other valuable descriptions of Timber.

5. From Capt. Phayre's report it does not appear that the Teak trees in the Sandoway district which he visited, are more valuable than those seen by Lieut. Hopkinson, in short it is evident that there is no teak forest in Arracan, but it cannot be doubted that the tree will grow very well in this Province, more especially along the foot of the different ranges of hills, and the only question is whether it would be worth while to take any steps on the part of Govt. to plant forests. I am aware that many years ago some Govt. forests were planted in Bengal, but I know not what has become of them. It is probable that the supply of Teak wood now obtained from Moulmein and the Malabar coast, is sufficiently abundant to render it inexpedient to devote any expence or particular attention to the rearing of trees elsewhere on Govt. account, and therefore I will not dwell further on the matter.

6. Both Capt. Phayre and Lieut. Hopkinson seem to have done all that was required of them, the latter in particular at very considerable personal toil and inconvenience, and I am extremely obliged to them for the trouble they have been at.

I have the honor to be, &c.
(Signed) A. Bogle,
Commissioner of Arracan.

Arracan Commissioner's Office,
Akyab, 30*th November,* 1844.

To Captain A. Bogle, *Commissioner of Arracan, Akyab.*

Sir,—Having returned from my mission up the Koladyne river, undertaken by your instructions, with the view of verifying the accuracy of the information contributed by Mr. Brown, on native authority, of the existence of a Teak forest of considerable extent, and in a situation on the left bank of the Oothalong Kyong, a small tributary of the Koladyne, offering the greatest facilities for the transport of the Timber; I have now the honor to submit the result of my observations, which were made as accurately as the nature of the locality would admit.

2. To begin, I am afraid I cannot concede to Mr. Brown or his native informants any honor that may be supposed to attach to this so called discovery of a new Teak forest. I find the locality to be identical with that which has now for some years been well known to exist, to those whose connection with the management of the district would put them in the way of acquiring such knowledge. Capt. Phayre in a communication to you as far back as 1839, notices the fact of Teak being found near the Oothalong, and Mr. Brown's servants themselves were conducted to where the Teak grew by the Kyouk of the Koladyne circle, who may be looked upon as the natural depository of all statistical information appertaining to his particular circle, and who in fact as I may bring to your remembrance, procured a small Teak log for you on a former occasion; I have also heard vague stories of specimens of Teak wood having been procured in Arracan by Mr. Commr. Hunter, and sent for inspection and trial to Calcutta, and in some tables now before me, compiled by Captain Baker, of the Engineers, on the relative strength &c. of various kinds of Timber, I find with Rangoon, Pegu, and Malabar teak, *Mugh* gun carriage teak plank also compared, which from the name one would he led to infer, came from this Province.

3. The parties who originally brought to our notice the existence of Teak would of course be questioned, and would be able to answer as to its extent, and the possibility of working it profitably, and they did accordingly report, that the trees were few in number, deficient in girth, scattered here and there, growing on high hills in different situations. So discouraging a statement was not likely to stimulate further

enquiry, and little attention was paid to the subject, until Mr. Brown's magnificent representation, invested it anew with a character of such importance, as to render it in the highest degree desirable, that more minute investigations should be immediately instituted. You were pleased to intrust me with the conduct of the investigations, and the result of my observations and enquires, I regret to inform you, only confirm in every particular, the truthfulness and correctness of the accounts we had previously received. Of the facility of transport I will speak hereafter, of the trees themselves, all I can report is, that they are situated on a declivity of a steep hill or mountain, in a dense and almost impervious jungle, for the most part Bamboo, interpersed with various kinds of forest trees, Teak among the rest, but by no means predominant. I visited the spot on two occasions and plunged into the depth of the jungle to see all that was to be seen, but I feel confident that I did not meet with sixty teaks and these by no means what I should think would be considered fine specimens. I could only count six, (what were evidently looked upon by the natives as "show" trees,) but there might have been eight or ten that barked and trimmed would have yielded a cubic foot of material, the others were mere saplings averaging with bark and all perhaps eight or nine inches in diameter and fitted at most for light spars, and topmasts of small boats, they were very high however, running some fifty or sixty feet. I was assured by those who accompanied me, the Kyouk among the rest, that I had seen all the trees that the natives knew of themselves, and I have no doubt that this is the truth; but neither they nor I can say what may be found in the further recesses of these primeval forests. I may notice here that the soil would appear admirably adapted for the production of Teak or any other tree, consisting of a soft friable clayey slate and disintegrated sand stone with a very rich deposit of vegetable mould.

4. In considering the accessibility of the place, I should say that nothing short of a profusion of Teak of the very largest and finest quality could compensate the speculator for cutting it in such a situation, and then not without the application of much energy, attention and mechanical skill, he would I think have difficulties of a very formidable nature to contend with before he could get his timber to the Koladyne, and the supervision of a skilful European mechanic would be absolutely necessary. The mouth of the Oothalong Kyong, is about an hour's row from Krakyus Village. I arrived off it at 8 P. M. in a light canoe extremely well manned, but I was five hours and a half in ascending to, where the mouth of a small water course on the left bank, marks the road to the teak locality, and although it was yet the rainy season and much rain had actually fallen, the Oothalong was so shallow in many places that my rowers were constantly obliged to jump out and drag the boat by main force over the bed of the nullah, and in descending, the deficiency of water was much greater, though only one day had intervened, thus showing, that this nullah could only be of use for floating timber at the very height of the rain floods, and then even the necessary rapidity of the current and the short and sudden turnings of the nullah, would not be without their difficulty. Landing at the mouth of the water course to which I have above alluded, an hour and a half of brisk walking brought me to the first teak tree, the road gradually ascending and following in the exact bed of the torrent, which I found quite dry except where at the foot of the steeper declivities small pools of water, in some places of considerable depth, remained. The difficulty of moving may be imagined, when I state, that it was only by going bare foot, and with the assistance of an iron-shod stick, that I could manage to ascend the huge slippery beds of sandstone and slate that obstructed my route, which yet impracticable as it may be,

is the only one available for the transport of even the most accessible of the trees; much of course might be done, were the returns likely to make up for the outlay, by levelling and improving the road, and by the use of rollers, windlasses, and other mechanical appliances; but to conclude, as things are at present, and with present facilities, I do not think, with the best arrangements, that the most enterprizing individual, were he to cut, bring down to Akyab, and ship to Calcutta, every stick of Teak yet discovered, would realize a clear profit of six hundred rupees.

I have, &c. &c.
(Signed) H. HOPKINSON,
Junior Assistant Commissioner.

J. A. A. C. Office, Akyab,
the 8th October, 1844.

To Major A. BOGLE, *Commissioner of Arracan.*

SIR,—I have the honour to report to you, that hearing of the existence of the Teak tree in the circle of Toungoop in the Sandoway district, I proceeded from my station towards that place on the night of the 27th October.

Having reached the village of Kanboing, the residence of the Thoogyee of the circle, I proceeded on the 31st to the spot where the trees stand. They are situated about three miles in an easterly direction from the village of Kanboing. They stand upon two small hillocks close to each other, and each containing from three to four acres of land, partly also on the side of a larger hill immediately adjoining; the whole in fact are connected together with scarcely any interval. There are the Pyeen or Iron wood, and other forest trees mixed with them. I only found two Teak trees of a diameter extending to two feet; one of these was crooked, and both diminished to a diameter of one foot, at a height of ten or twelve feet above the ground; the greater portion of the trees did not exceed ten or twelve inches in diameter, and 40 or 50 feet in height above the ground, they were scattered about at intervals of twelve or fifteen feet apart of all sizes, from the seedling of last year to those of the dimensions I have mentioned above. I saw only two trees (the large ones before mentioned) which it appeared to me, would be any object to a timber merchant. The total number of Teak trees upon the two hillocks, and the side of the larger hill, is about one hundred and fifty.

From enquiries I made in the vicinity, I have no doubt that these Teak trees were not originally indigenous to the soil; the tradition concerning them is that they were planted upon this site by two brothers, settlers from the eastward, (Burmah proper), and it is agreed upon by all the neighbouring "oldest inhabitants" that this occurred before the Burmese conquest of Arracan in A. D. 1784; from this and other circumstances, I have little doubt but that the plantation was made about one hundred years ago. I do not suppose that any of the original trees now exist, for though I am not conversant with the ratio of growth for age among trees in general, and have no data regarding that of the Teak tree, yet none of those I saw, except the two larger ones, appeared to me to require more than twenty years to reach the size they had attained. There is no doubt also from what I heard, that some large Teak trees have within the last twenty years, been cut down upon this spot by the neighbouring villagers for boats and other purposes. Indeed, I saw the stump of two small trees which had evidently been cut down lately. As all forest land and produce in Arracan are the property of Government, and it may be considered an object to preserve these Teak trees, I have for the present strictly prohibited any more being cut down until I receive your orders on the subject. Should it ever become an object to cut trees upon this spot, they can be removed without difficulty to Kanboing village, which stands upon the Toungoop river, about ten miles from the sea. To this village, boats drawing 5 feet of water can approach during the spring tides. I have, &c. &c.

(Signed,) A. P. PHAYRE,
Lieut. and Bt. Capt. Senr. Asst. to Commr.

On board the Schooner "Swift,"
Toungoop river, 1st November, 1844.

To JAMES SUTHERLAND, *Esq. Secretary to the Superintendent of Marine.*

SIR,—With reference to your letter No. 948, dated the 30th August, 1844, and enclosed therein in original a letter No. 115, dated the 22d of the said month from Captain Bogle, Commissioner of Arracan, respecting a certain piece of Teak timber sent here in the "Amherst" for the purpose of testing and reporting of its quality,—I beg now to state that notwithstanding the piece was lately cut, as stated, still I am led to believe it is the growth of good soil, and the scent of it is as good as Rangoon or Moulmein Teak.

The last piece of Teak timber, and which was forwarded to the Superintendent in the "Amherst," and received in the Government Dock Yard, is well seasoned, and appears to be as good as either Moulmain or Rangoon Teak.

This was a part of the same tree with the above.
A. Bogle.

From the general statement given in by Captain Bogle, it would be advisable to hold out encouragement to the Mughs, to get into the interior of the country for the purpose of cutting down Teak timbers, and as for red Jarool it is in high repute, as all the ships that were built in Chittagong, the frame timbers and bottom plank was of Jarool wood; the texture is knotty and hard, but what is termed white Jarool is quite pithy and not fit for any standing work.

I have, &c.
(Signed) J. SIMPSON,
Builder and Surveyor.

Kidderpore, Govt. Dock Yard,
the 2d November, 1844.

Report on the existence of Teak trees on the Banks of the Thaddé stream, in the vicinity of Sandoway.

(Communicated by the Government of Bengal.)

To J. Hume, *Esq. Honorary Secretary, Agricultural and Horticultural Society.*

Revenue.

Sir,—In continuation of my letter No. 96 of the 29th ultimo, I have the honor to forward for the Society's information copy of a further report from the Commissioner of Arracan, dated 23rd ultimo, shewing the existence of teak trees on the borders of the Thaddé Stream near Sandoway.

I have &c.
Cecil Beadon,
Under Secy. to the Govt. of Bengal.
Fort William, 12th February, 1845.

To the Secretary to the Government of Bengal, Home Department.

Sir,—In continuation of my communication, No. 6, dated the 30th November last, regarding the teak localities of this province, I have now the honor to submit copy of a letter No. 1205 of the 27th ultimo, from Capt. Phayre, Senior Assistant Commissioner at Sandoway, reporting the existence of some teak trees on the banks of the Thaddé stream not far from his station.

2. I believe this to be the very first mention ever made of these trees, and I see no reason to doubt that they are indigenous; it is to be regretted that there are so few of them.

3. Capt. Phayre laments the migration of the mountaineers of the Yooma range to the plains, but I greatly rejoice at this proof of the increased confidence of these poor people in their rulers.

4. The inconveniences and privations of a mountain life are seldom encountered except to avoid tyranny and oppression in the plains; when the current of migration sets the other way, there is no cause for regret.

In a political point of view the sooner the frontier ranges become a howling wilderness, the better, for the stronger and more impassable will be the barrier between Ava and Arracan.

5. I should be glad if all the passes to which Captain Phayre alludes could be blocked up for ever. We can never want them either in peace or war, and they are only of value to Burmese dacoits.

I have, &c.
(Signed,) A. BOGLE,
Commissioner of Arracan.

Arracan Comr's Office, Kyouk Phyoo,
The 23rd January, 1845.

To Major A. BOGLE, *Commissioner of Arracan, Kyouk Phyoo.*

SIR,—I have the honor to report that there exist a few teak trees on the bank of the Thaddê Stream, not far from the site of the Allaygyan thannah which was removed last year.

2. These trees are of a larger size than those of Toungoup reported on in my letter of the 1st ultimo. I should not however consider them indigenous though I could learn nothing as to when they were planted; there are about one hundred of them. Were it required to cut them down they could easily be floated down the Thaddê Stream in the rainy season.

3. While upon this subject, I regret having to report that the whole of that hill country bordering on the Yoma mountains directly east of this town is becoming depopulated, and while I was there a few days ago the last rem-

nant of the Burmese mountaineers talked of emigrating to the plains. I regret this much, as they are the only people remaining to keep up our knowledge of and connection with, an extensive tract of mountainous country containing many paths into Burma; but if they find it for their advantage to leave the higher hills, of course, I shall be very glad to see them better their condition.

4. Since the devastations of Thaioo, the dacoit, some years back, these hills have gradually become deserted by the population, and unless any of the former people who emigrated to the Burmese dominions should again return, I much fear that in another year or two these mountains will present nothing but, as far as human inhabitants is concerned, a deserted waste.

I have, &c.
(Signed,) A. P. PHAYRE.
Senior Assistant Commissioner.

Arracan, S. A. C. Office, Sandoway,
The 27th December, 1844.

Report on the Thoungyeen River, (Tenasserim Province,) and on the Teak Forest in its vicinity.

(Communicated by the Government of Bengal.)

To the Honorary Secretary Agricultural and Horticultural Society.

Revenue.

SIR,—I am directed by the Right Hon'ble the Governor of Bengal, to forward the accompanying copy of a Report on the Teak Forests on the Thoungyeen River, Tenasserim Provinces.

I have, &c.
CECIL BEADON.
Under Secretary to the Govt. of Bengal.

Fort William, 5th Feb. 1845.

The river Thoungyeen takes its rise in the mountains called Kyouk Kait about 120 miles from Moulmein in a S. S. Easterly direction, and continues its course nearly N. W. to Lat. 17° 50′ 46″ N. emptying itself into the Salween river at the northernmost point of the British Territory, about 80 miles from Moulmein. Its average breadth is about 80 feet, and its waters during the N. E. monsoon are perfectly clear, with a sandy and rocky bottom. The country towards its junction with the Salween is mountainous to its very banks, but here, not a single teak tree is to be seen. Above the point at which the main road from Zimmay crosses the Thoungyeen, the country is comparatively level near the river, but gradually rises towards the ranges of mountains on either side of it.

Taroke Choung.

The Tar-oke Choung is the highest forest visited by me. The Thoungyeen here is shallow and rapid, and timber is never brought from above this point, nor does the road for elephants or men extend beyond it. It contains several hundred trees of the largest size, and of very straight growth, increasing in number towards the tops of the hills. A few hundred trees have been girdled in this forest by a Karreen named Tha-doke, late Thooghee of the Village of Koklaik, but as yet no trees have been removed, on account of the great difficulty that would occur in dragging them to the main stream, as the Tar-oke Choung is too rocky and narrow, to allow of timber to be floated down it, and even when dragged into the main stream it would require many elephants to push it along, the water being very shallow. Teak is said to be more abundant on the Shán side opposite the mouth of this stream.

Megualar Forest and Stream.

The next forest below Tar-oke is on the Megualar stream which is equal in breadth to the Thoungyeen. This forest extends for several miles on either side of the Megualar and has been partially worked by the Karreens of that district. Teak is the prevailing tree in this forest and grows larger than any I have seen, one measured by me was 14 feet in the girth. Young trees are growing up annually, but a great many of them are destroyed by wild elephants as well as by those used by persons employed to drag and bring down timber. The five elephants with my camp were observed to destroy, daily, numbers of young trees amounting often to 2 or 300. Nga Bean has worked in this to the extent of 7 or 800 trees, but as yet about 300 only have been removed. Teak occurs in occasional patches of from 50 to 100 trees between the Tar-oke and Megualar Choungs, but is to be found of much finer growth towards the hills.

Fir Forest.

About four miles to the Eastward of the mouth of the Megualar stream is a fir forest, extending several miles in a N. Westerly direction; the soil on which this tree is seen to grow, is of a red gravelly nature, and the country here is never flooded. The fir does not grow to a very large size and the bark is very thick; I doubt whether a spar of three feet circumference after taking off the bark could be procured. The Karreens annually destroy a great many by making a large incision near the root of the tree for the purpose of extracting the turpentine, which they use in great quantities for making torches. Few trees of other kinds are intermixed with the fir, and young trees are growing up annually.

Kyouk Kait.

Following the downward course of the Thoungyeen, teak occurs in occasional patches near its banks; it is more plentiful near the hills called Kyouk Kait where the banks of the river are upwards of 300 feet high. There is a fall of about six feet in the bed of the river, which is caused by the projection of two rocks, between which there is not a water way of more than six feet during the dry season; this makes it very difficult for the foresters to bring down the timber from the forests above this. The usual mode of passing the hill grain down this river adopted *by the Karreens, is by raft which they form by lashing together* 10 or 12 bamboos, this raft they do not hesitate to guide down the falls, but several accidents have occurred sometimes attended with loss of life. There are several villages inland between Megualar and Kyouk Kait hill.

The Specimen is marked A.

One of the Karreens of Kyouk Kait brought a piece of wood to me, which he stated as being the most durable wood used by this race of people for making spears, dar handles, &c. and that this was the only place from whence it could be procured. The tree itself grows to a large size and will not float even when seasoned. The wood is not known to Burmans in Moulmain.

Old Town of Meerawaddee. Latitude of Meerawaddee 16° 33′

Twenty-two miles to the Westward of Kyouk Kait is the old town of Meerawaddee situated in a bend of the river. It is surrounded by a brick wall ten feet high and 8 feet thick, in the form of a square, and has two entrances, N. and S. Nothing now remains, but the ruins of several Pagodas in the midst of jungle; fruit trees of different kinds, but principally the mangoe and jack are plentiful, on either side of the river. On the right bank or Shan side of the stream, young teak trees are very numerous, while scarcely an old tree is to be seen.

Rice plains.

There are extensive plains commencing about five miles east of Merawaddee, which were formerly used by the inhabitants for cultivating grain. The fir forest before mentioned extends as far as the old town, but is not seen to pass the Mepelai stream. This stream is about fifty feet broad, and takes it's rise from a hill of the same name, it is well calculated for bringing down timber of any size, and abounds in teak of very fine growth.

Mepelai stream.

Mekenai and Lammat Choungs.

The Mekenai and Laumat Choungs are tributaries to this stream, and on their banks, young trees are very numerous, but large timber is not as abundant as on the Mepelai. These forests have been worked by the Karreens of Mekenai village, but no killed trees have as yet been felled, the fallen or dead trees only have been removed. The teak is of very straight growth on Mepelai hill, rising without branches, to the height of upwards of 100 feet; they could only be brought away by an efficient force of men and elephants.

Thengan Tree.

The Thengan tree, which is used by the Burmese for making their boats, is very plentiful on Mepelai hill. On the flat country between the range of hills, and the stream, the soil is rich and of a black sandy nature, and the underwood so thick as to prevent persons penetrating it on either side of a small road or pathway, made by the Karreens in travelling from one village to another.

Komokala.

Teak is not to be seen for more than two miles inland, till you arrive at Komokala, where it grows very large. The Karreens of the village of Komokala, have killed a great many trees; there are three rapids at Komokala, over which it is very difficult to float timber except during the months of December and January. The banks of the river are perpendicular, and very high.

Padouk tree. Merruai Choung.

The Padouk tree is very plentiful on this hill. Below Komokala is the Merruai Choung, which is the highest point worked to any extent by the natives from Moulmein. Teak is very plentiful on this stream as well as on the smaller ones tributary to it.

Tigahore Choung.

Tigahore is the next stream, and one of considerable breadth, abounding in teak of the largest dimensions. The country below Komokala is more hilly than above it, and the river is broader, with sand banks, sometimes a mile in length.

Terrapensike.

Terrapensike, so called on account of the mangoe tree growing there, contains very fine teak.

Kunnoo and Wynsaw Choungs.

Kunnoo and Wynsaw, are the two streams which have been mostly worked, but the whole country between the Komokala hills, and Maithee

Choung is covered with teak, and on many of the intervening streams teak is the prevailing tree. Very few of the teak trees that have been brought to Moulmein from the Thoungyeen forests, appear to have been seasoned timber, for the wood of this district will never float till the lapse of four years after girdling. The quality of the timber cannot therefore be said to have had a fair trial, for that which might have been partly seasoned has been brought down intermixed with dead timber, without which it could not have been floated.

All the tributary streams as well as the main river are full of sunken timber cut down before the tree has been properly seasoned. On each of these streams Karreen villages occur at intervals of 10 or 12 miles. These Karreens stated to me that they had only commenced killing timber four years ago, and that before that time all the timber brought away from the Thoungyeen by Burmans, was "Narthat," or trees that have perished from natural causes.

The Karreens annually destroy a great number of young trees in clearing away the jungle for their cultivation; they prefer spots where young teak abounds to any other, the soil being generally richer and well elevated. The young tree shows itself in all the Thoungyeen forests of all sizes, and bears a proportion of 10 to 1, to the old trees; in some parts, as near Meerawaddee, the young teak is seen to spread for miles and often unmixed with other young trees.

Lance wood.

Lance wood may be procured from the hills near Maithee stream, but I could not ascertain if it was procurable in any large quantity, having only met with three or four trees. It grows very straight to the height of about forty feet, and is from three to four feet in girth. It is used by the Karreens for making bows.

Wenive stream.

The next stream below Maithee of any size is the Wenive, issuing from a smaller range of mountains, connected with the Toung Ghee by small hills. Teak is very scarce about here, for only a few patches of trees were seen by me between Maithee Choung and the main road from Zimmay to Moulmein. Below this road about half way to the mouth of the river, only one small clump of from 20 to 30 trees was seen on a small creek, but the timber was very small and of very inferior quality.

The march here is also very tedious, as along the bed of the stream is the only way practicable, crossing and recrossing it from one sand bank to another without any shelter from the sun; several elephants have died of fatigue in performing this journey.

Roads to the Thoungyeen.

Koklaik-lan.

The road from Moulmein to the higher forests on the Thoungyeen is called the Koklaik-lan, as it passes through a village of that name commencing at Megalan on the Houndran river. It is of considerable breadth and practicable to horses and elephants, where it crosses the range of mountains there are three ridges, but these are neither steep nor very high. It falls on the Thoungyeen about 3½ miles north of Menawaddie which may be reached by this road in 9 days, marching about 8 hours a day.

Nubboo Lan.

The next road below this is the Nubboo Lan which verges on the left bank of the Nubboo stream, a tributary to the Shaing Bonai river and takes it's rise in the Toung Ghee Mountains.

This road is not much used at the present time, the passage over the mountains is practicable to elephants but not to horses or other cattle.

It reaches the Thoungyeen river opposite the village of Melamar at the mouth of the Melamar stream and occupies from 10 to 12 days from Moulmein.

Daunat-Lan.

There is another road which is generally used by the wood-cutters, being the shortest way to the forests worked by natives of Moulmein, but this is far more tedious than the other two, and very difficult to ascend.

By this road the passage from Moulmein to the Thoungyeen occupies only 7 days.

Last year two elephants were killed descending Daunat Toung.

This road commences from Dargyne and crosses the Thoungyeen between the Kunnoo and Wynsene streams.

Main road from Zimmay.

The lowest and most frequented is the main road from Zimmay, and by which the greater part of the Shan cattle is brought to Moulmein.

It leads through a gorge in the Wenive Hills, a branch of the Toung Ghee, and might be made practicable for carts or caravans between the Thoungyeen and Moulmein.

The total number of trees said to be killed on the Thoungyeen and which are claimed, is as follows:—

13 Streams between Komakala and Maithee.

By Burmese, ...	
Karreens, ...	
The higher forests, that is from Megalar upwards, are estimated to contain,	10,000
Mepelai stream, ...	10,000
And the streams between Komakala and Maithee Choung upwards of 3,000 each, ...	39,000
Being in all, including felled trees and those fit for felling.	

These numbers are given from information derived from the Karreen Inhabitants of the district.

(Signed) W. R. MALING.
Asst. Surveyor, Forest Dept.

Moulmein, 4th September, 1844.

A descriptive account of the tree which produces the Gutta Percha; by the Rev. EDWARD WHITE. *Communicated by* F. J. MOUAT, *Esq.*, M.D.

To JAMES HUME, *Esq. Honorary Secretary to the Agricultural and Horticultural Society.*

SIR,—I beg leave to enclose, for insertion in the Society's Journal, the accompanying description, by the Rev. Edward White, of the tree which produces the "Gutta Percha," a subject which has attracted considerable interest, and of which a record is already contained in the Journal.*

The paper will possess an additional and melancholy interest in the estimation of the Society, when it is known that it was originally sent to the late Mr. Griffith, and reached Malacca on the very day of his death. The Rev. Mr. White of Singapore, is already known as one of the most eminent amateur Botanists in India, and was highly esteemed as such by Mr. Griffith, who regarded all his observations and contributions to the science as valuable, and worthy of record.

I have, &c.
F. J. MOUAT.

Medical College, 24th March, 1845.

Gutta Percha, Linn. Cl. Dodecandria Monogynia; Nat. Famy. related to Sapotaceæ and Ebinaceæ.

Trunk straight, lofty, diamr. 3 feet at base; branches numerous, ascending: terminal buds white from exuding gutta.

Leaves crowded at extremity of the branches, alternate, petiolate oblong with a small point at the apex: base tapering—length 4-5 inches, breadth 2 inches. Surface, *upper*, bright green, feather nerved; *under*, brownish red from dense pubescence: mid-rib and petiole the same. The latter one inch long, channelled, not articulated with the stem.

---

* The experimental observations of Dr. Mouat, as to the chemical nature of this substance, will be found, in Vol. 2, page 101; and some further information by the late Mr. Griffith, in Vol. 3, page 143.—EDS.

Stipules 0. Flowers axillary, sessile, four together, disposed in a quadrangul manner; small and white.

Bracts 0. Calyx persistent, sepals 6 brownish-red, in a double series, three outer largest. Œstivation valvate.

Corolla monopetalous 6 cleft, lobes $\frac{1}{4}$ and tube $\frac{1}{8}$ inch long, deciduous. Œstivation tarsted.

Stamens 12 in a single series, equal, similar, inserted in the mouth of the tube. Filaments equal in length to the lobes of the corolla.

Anthers sagittate, exturse, affixed by their base to the filaments. Pollen scanty.

Ovary superior, conical, sessile, seated on a disk, 6 celled each cell containing a single ovule suspended from a central axis: funiculus conspicuous.

Style longer than the stamens, persistent; stigma undivided. The specimen was not in good condition, and I was unable to ascertain whether all the anthers are fertile: apparently not. The timber is represented as hard, and used for building prows, &c. The Malays speak of another less robust tree with similar leaf, but different in colour of its flower (red) and shape of its fruit, which yields a white, brittle and useless gutta. The fruit of the former is sweet, of the latter acid.—E. W.

THE JOURNAL

OF THE

Agricultural & Horticultural Society

INDIA.

Observations on the applicability of Artificial Manures to the cultivation of the Sugar-cane, with some suggestions for the amelioration and extension of the Sugar cultivation in Bengal. By T. F. HENLEY, ESQ.

The object proposed in the following observations will doubtless obtain for it a favorable reception on the part of every one interested in the cultivation of the Sugar-cane. No more in fact is proposed, than to request attention to the peculiar suitability of the modern concentrated artificial manures, to the cultivation of the Sugar-cane and to the position and circumstances of the Sugar Planter. Every one has heard of the immense agricultural progress which has already taken place in Europe, and more especially in England, from the application in practical farming of various salts and artificial compounds destined to fertilize the soil, and augment its produce, and replace, if necessary, the total absence of ordinary manures. Practical experience has now confirmed what science had indicated, that the fertilizing effects of ordinary manures may be obtained by the employment of comparatively minute doses of certain salts containing the same principles.

The nature of soils and the plants they are calculated to support, have been the objects of the most exact study, and have thus permitted the determination in a precise manner of the composition of the most appropriate fertilizers. "The time is not distant," says the illustrious Liebig, "when our fields "shall be fertilized with different salts, in place of being with "manures always so insufficient, and which contain many "useless principles often contrary to the vegetation of certain "plants. Yes, with salts prepared in chemical manufactories "they will manure the fields, and that with as much certainty "as now in medicine the iodine cures the goitre, and that a "few grains of quinine, replace efficaciously in curing fever "several ounces of the coarse powder of cinchona."

The Sugar-cane has not yet we believe been examined in reference to the applicability of these modern agricultural ameliorations, and it is to this plant especially that we now desire to make an application of the principles. It shall be our object to endeavour to point out the peculiar fitness of special or concentrated manures to the culture of the cane, and to the position of the Sugar Planter. In order then to approach the subject we propose to ourselves, it becomes necessary for us to offer as briefly as possible a sketch of the mode of action of manures in general. A proper intelligence of this subject obliges us to enter on some details sufficiently abstract, and so little attractive, that we feel beforehand the necessity of requesting the indulgence of the reader, begging him to take the trouble of following us through a few very dry pages. Before going further then, we shall state briefly some general and elementary ideas on the principles of manures, their action and value as fertilizers. Ideas submitted solely to those who may not have been able to follow for themselves the important labours of Liebig, Bonssingault, Spregel, Johnson, &c. &c. in these matters, and assure themselves at the source of the impulse which European agriculture has already received, and to which colonial agriculture can no longer remain a stranger.

The elements of animals and plants are the same, the former obtain, through the latter principally, all the various constituents of which they are made up.

These elements (our province here is with plants only, and to them we confine ourselves,) however varied, however innumerable they may be in form, qualities, color, in which they may present themselves to us, are but about sixteen in number; of these, four are obtained from the atmosphere and water, and from the organic portion; and twelve from the soil, called the inorganic elements.

The organic elements then *consist of carbon, oxygen,* hydrogen and nitrogen.

The inorganic are silex, lime, magnesia, potash, soda, iron, manganese, phosphorus, sulphur, chlorine, and fluorine, (we omit iodine and bromine of marine plants.)

The experience acquired every day serving more and more to confirm the views and discoveries of Liebig in agricultural science, we confine our remarks in this sketch to the principles which he has laid down, leaving aside, for the present, those questions which are still at issue amongst scientific agriculturists. His doctrine of the uses of the phosphates and of the alkalies in plants may be sketched in a few words. The phosphates appear to be indispensable to the formation of all nutritious plants and seeds, and for the wisest purposes seem placed there, not only to supply the bony framework of animals, but as a constituent element of almost every part of their bodies. The alkalies act by fixing the carbonic acid of the atmosphere, which along with the elements of water under the combined influence of the vital force of the plant, and the chemical agency of the alkali, pass first into organic acids, such as the malic, citric, tartaric, &c. acids, and finally into sugar, gum, starch or woody fibre; all substances having the same essential composition.

The atmosphere principally supplies plants with carbon. Water furnishes the elements of hydrogen and oxygen. The nitrogen (according to Liebig) is obtained by plants from ammonia, diffused in the atmosphere, the vast recipient for all the nitrogen arising from extinct generations of plants and animals. The dews and rains convey to the soil the nitrogen of plants under the form of bicarbonate of ammonia. Liebig demonstrates by the most scientific calculations that the rains bring to the earth in the space of four months, (the European season or time supposed necessary for the maturation of the greater number of crops) about 112 pounds of nitrogen per acre; a sufficient quantity to supply with that element, the fields, forests and all wild vegetation. These calculations, although made in Germany, may serve as approximate data for our guidance.

Plants absorb from the àtmosphere, principally by means of their leaves, the important element of sugar, as likewise cotton, gum, starch, woody-fibre, &c. No known chemical agents possess such powers of composition and decomposition as the vital force of plants. This power decomposes the carbonic acid of the atmosphere, fixing its carbon for the various vegetable products above noticed. It decomposes water, retaining its hydrogen for the formation of oils, resins, wax, essences, &c. &c. Under its influence the decomposition and absorption of manure placed in the soil is hastened. What the nature of this vital force may be, we know nothing, and perhaps never will. Experiments demonstrate that, as in animal existence, electric currents circulate, and exercise a marked influence,—all else is mystery.

The atmosphere then contains all the elements essential to the formation of the organic elements of vegetables, in carbonic acid, in rains and dews, ammonia and sulphuretted hydrogen,—substances which are also the ultimate result of the decay and decomposition of every thing which has had an existence, either vegetable or animal. Thus, the death and dissolution of one race becomes the source of life and health to a succeeding generation.

Beside the organic principles to which we have above alluded as drawn from the atmosphere, plants contain small quantities of earthy and mineral matters or salts, termed the inorganic elements; these we have stated to be twelve in number, and composed of acids, alkalies and metallic oxides. These inorganic salts vary in number, quantity, and quality, with the different varieties of plants. Experience has demonstrated that these are as indispensable to vegetable growth and existence, and take as active a part in the nutrition of plants as the elements borrowed from the atmosphere; that they are the proper food of plants, and that, through their aid, we may in fact be said to feed and fatten plants as we would animals. This is important to be borne in mind in reference to the views to which we wish to call attention as regards the culture of the sugar-cane. They should exist either naturally in the soil, or be furnished to it artificially by means of manures, so that each plant may find in it the salts which are necessary to its organization.

The analyses of each variety of plant leads us to a knowledge of the salts it requires from the soil, and an analysis of the soil itself, permits us to discover what elements are deficient, and which manures are called on to furnish. Upon an exact knowledge of these facts is built up the whole system of rational agriculture.

The exhaustion of soils arises from the absorption of these essential salts by the crops, and not from the disappearance of its humus or carbonaceous matter, as had been supposed until the important discoveries of Liebig. He first pointed out that carbonaceous matter, whether the result of anterior vegetation, or arising from the decay of manures, was but of secondary importance as compared with the influence exercised by the inorganic elements usually contained in these substances; that in fact the application of these latter matters, deprived of the usually accompanying masses of carbonaceous matter, exercised an equally beneficial influence on vegetable life. The important experiments of Wiegman and Polstorf have completely established the correctness of these views, and in these principles may be traced the whole theory of the utility and success of the modern concentrated manures.

It is important that clear ideas be established of the secondary value of the vegetable or carbonaceous matters of manures, in order to the full comprehension of the principle of essential salt fertilizers.

In illustration of these ideas as to the secondary importance of carbonaceous matter in the soil, we will give the words of Liebig himself. He says* (we quote from the French edition), "A question arises here, that is, to learn from whence the "grass of the field, the oak of the forest, receive their carbon, "since that *element is not conveyed to them by* manures; and "whence arises it, that far from becoming impoverished, "these soils become richer every year in this element! A "certain portion of carbon is withdrawn annually in the form "of timber and of hay, and notwithstanding that, the quantity of carbon augments in the soil; and it becomes richer "in humus? Certainly no one can contest the beneficial influence which manures exert on the development of plants "submitted to its action; but *it is positive that the manure "does not concur in the production of the carbon of the plants, "and that it exercises no direct* action on it; for as we have "demonstrated by facts, the quantity of carbon which results "from manured land is not greater than that yielded by "those which do not receive this substance. From all we

---

* Chimie organique appliquée à la Physiologie vegetal. Par Justus Liebig.

"know, humus is a product of the putrefaction or slow "combustion of plants or of vegetable matter. There cannot "therefore have existed a primitive humus, for before the "humus there must have been plants. . . . . They deceive "themselves singularly," continues Liebig, "in attributing "to the disappearance of the humus of the soil that which is "properly the consequence of the withdrawal of its salts.

"The soil in the neighbourhood of Vesuvius, formed from "the disintegration of volcanic lava, may be considered as "the type of fertile soils; its igneous origin does not admit "of its containing the least trace of vegetable matter, and "nevertheless it is well known, that when these volcanic "cinders have been exposed for some time to the influence "of air and humidity, a soil is formed in which plants attain "the highest point of luxuriance. We must attribute this "extraordinary fertility to the presence of the alkalies contained in the lava, and which by this disintegration of the "rock become gradually assimilable.

"In order that a soil be propitious to a plant, it is necessary that the latter should find all the inorganic principles "or salts necessary to its development in sufficient quantity, and in a proper state for assimilation. All plants "require alkalies, some in the form of silicates, others in the "state of tartrates, citrates, acetates, oxalates, &c. &c. A "third species requires phosphate of lime, another phosphate "of magnesia, and others definitively do not prosper without "carbonate of lime. The vegetable matters which are conveyed to the soil by means of manure, exert, it is true, a "certain influence on vegetation, and that because during "their rotting, they nourish the young plants with carbonic "acid. Nevertheless, in considering all circumstances, it will "be agreed that *the influences of the vegetable matter of ordinary manure can hardly be of much importance*, and that "it is exclusively to the inorganic matter that it owes its efficacy. It may be therefore concluded from what precedes, "that *the dung of animals may be replaced by substances* "which contain the same principles."

Now it being once conceded, that the great mass of vegetable or carbonaceous matter of ordinary manures, is of but little importance to the nutrition of growing plants, it will not be difficult to explain on what small portions of matter the true source of fertility depends, and thus in few words demonstrate the immense fertilizing powers exhibited by the application of comparatively homœpathic doses of artificial manures. On referring to a number of analyses of farm-yard manures given by Boussingault, we find that he gives 79 per cent. as the mean quantity of water contained in such matters, leaving 21 parts or pounds of dry vegetable matter and salts; that is, more than three-fourths of manure is simply water, of the remaining 21 pounds, about 7¼ are carbon, the element with which Liebig has shown plants can provide themselves from the atmosphere, as likewise with the oxygen and hydrogen, forming about 6¾ pounds of the remainder; leaving for nitrogen and inorganic salts but six parts or pounds. The latter in fact represent the whole of what we really convey of useful to the field in 100 parts or tons of manure, and again, of this a large part might be dispensed with as being in general an abundant constituent of the soil itself. Of the physical action of vegetable matter in opening the soil we shall speak hereafter, but even this action does not appear to be of the importance which was formerly attributed, more especially in soils of good natural constitution or rendered so by tillage.

We are so accustomed to treat of manures by the cart-load or in large masses, that the idea may be received with some degree of incredulity, that the same effects may be produced by small quantities of matter and with much less effort; that there may be shown some hesitation perhaps in adopting the method of fertilization to which we beg to call attention. Nevertheless, nothing is more correct than what we have above stated, nothing more positive or incontestable than the results obtained in England on the subject. At the present day practice is altogether in harmony with theory. Ordinary stable manure or dung may be replaced by essential salts of facile application, of easy transport, requiring the smallest quantity of manual labour, and economical in outlay, all conditions having peculiar weight with the sugar-cane cultivator. The extent of surface to be manured will not in future arrest the efforts of the sugar planter. It will be no longer a question of a limited extent of plantations, confined by the quantity of manure he can scrape together, but a question of fertilizing the whole extent of cultivation, including not only new plantations but his rattoons of all ages, sustaining the powers of the soil in reference to the latter, so as to bring round in due season, not a great extent of scrubby diminutive canes, but a full grown productive crop, the result of the application of artificially prepared salts of ammonia, phosphates, and the alkalies.

This great improvement in the culture of the cane may be effected without augmentation in the number of labourers; without other means than those which the actual modes of plantership place at the disposal of the planter.

As a general principle it may be assumed, that in any branch of industry in which the natives of India can obtain by their simple processes, a maximum or nearly so, of produce, the prudent European should be very cautious of entering into a competition with them; for their small outlay in stock and personal expenditure, simple and ingenious methods, great economy, their highly intelligent and practical knowledge of all agricultural details suited to the nature of their soils and climate (knowledge too generally underrated) form together a mass of circumstances, which will inevitably give them advantages, with which the European farmer cannot compete, whenever it becomes a question of the most economical means of producing any given crop. The most prudent proceeding is to enlist them on his side, or in fact establish the *ryotty system.* That system in short which forms the special attribute of Euro-Indian agriculture, and gives the Bengal planter advantages possessed by no other British colonist, the full value of which can be only felt by those who have witnessed the difficulties experienced by the old sugar colonies, expending their very hearts' blood, in the endeavour to supply themselves with the primary element of labour.

In connection then with a ryotty cane cultivation, we would beg to suggest and submit to the consideration of the planters of Bengal, the applicability of a system of advances of concentrated artificial manures to the native cultivators, as is now the practice in reference to indigo seed? The transport of such a substance could form no objection. Its application requires no special knowledge, or augmentation of labour, which is not altogether in accordance with the careful methods of the native cultivators; whilst augmented produce is in the interest of both parties. We beg the examination of this view of the subject to those interested.

The question of manures prevails over all others in agriculture. With their assistance every thing becomes possible. There are no more bad soils. The poorest cease to be ungrateful, provided always that they possess certain physical qualities of friability, depth, drainage, and without which no attempt at sugar culture should be made, and which are too obvious to be dwelt on here, in addressing practical men. We return again to the subject of the fertilizing principles of manures, in order to bring out as clearly as possible the good results which may be derived from the application of concentrated fertilizers by the European Sugar Planter.

The data furnished by European scientific agriculturists will aid us here in determining the approximate value of the fertilizing salts contained in colonial manure, in the absence of special analyses made in the country. According to

Boussingault, a normal farm yard manure, composed of the excrements of horses, cattle, pigs, &c., and of their litter impregnated with urine, contains about 78 per cent. water; 17.6 per cent. organic matter, including 4 per cent. nitrogen; and 4.4 per cent. inorganic salts.

It is to these latter substances, and the nitrogenous elements, as we have before stated, that its happy influence on vegetation is principally due. The inorganic elements are in 100 parts,

Phosphate of Lime,..	9·6
Phosphate of Magnesia, ...	8·0
Per phosphate of Iron, ...	5·5
Lime combined with carbonic acid,	9·0
Lime combined with sulphuric acid,	3·1
Potash combined with sulphuric and carbonic acids, ...	18
Silicic acid, ...	630
	100·0

Many circumstances of course tend to modify the nature and qualities of farm-yard manure. The food of the animals will influence its properties, for the larger the proportion of grain they receive, the greater will be the proportion of nitrogenous elements and useful salts in their excrements. The manures of Europe should be superior weight for weight to that of hot countries, in as much as the colder climate will occasion a greater consumption of the carbon of the food for the maintenance of the animal heat and respiration, and enrich proportionately their dejectures.

The absence of correct knowledge of the true principles of manure, had, until lately, enveloped its action in obscurity, and given rise to vague impressions that the act of digestion exerted some mysterious influence, and concurred powerfully in giving it its fertilizing qualities. It was hardly suspected that the fertilizing action due to the excrementitious matters, in place of being the result of digestion, was due to nothing else than the salts already contained in the food of the animal. It was little suspected that the same grain and fodder, if conveyed to the field without previous digestion, would occasion even greater fertility. Common dung is richer in salts and nitrogen than an *equal weight* of the vegetable matter which produced it, in this, that the animal has expended a considerable portion of the carbon of the food to sustain its animal heat and respiration. The residue contains nearly all the inorganic salts and nitrogenous matters. This will appear clear from the following approximate calculation. Suppose a horse to consume 40 lbs. of grass, (green) and 8 lbs. of gram per day; these substances will contain approximately,

viz. 40 lbs. grass contain lbs.	4	7	oz. carbon &	1¾	oz. nitrogen
8 ,, gram ,,	3	5	ditto,	2	idem
	7	12	carbon	3¾	nitrogen, to

which add about one pound phosphates and inorganic salts. The animal would consume, in order to sustain the respiratory functions, from 2½ to 3¾ lbs. carbon per day, varying according to the labor which may be imposed upon him, and the atmospheric temperature. In taking a mean term for moderate labor we have a daily consumption of 3⅛lbs. carbon. The food given to the animal contained 7¾ lbs. carbon with 3¾ ounces nitrogen, and one pound of posphates and inorganic salts. In the excrementitious matters, it will be observed, (having deducted the 3⅛ lbs. carbon) there remain but 4⅝ lbs. carbon against nearly all the nitrogen and inorganic salts, in admitting that the waste and repair nearly balance each other. It is therefore manifest that the manure will be richer in salts than an *equal weight* of the food which furnished it, although in reality poorer than the original food in fertilizing matter, in as much as there is always loss of nitrogen and salts in the perspiration, &c. &c.

In order to render more evident our ideas with reference to the advantages which the soil derives from a manuring, we will reduce into figures the elementary composition of 20 tons of manure, supposed to be applied to one acre of land, and calculated after the analyses we have selected, viz :—

20 Tons of manure equal,	lbs.		44,800
Water, at 78 per cent.,	,,	34,944	
Animal and organic matter exclusive of nitrogen at 17-2 per cent.,	,,	7,705	
Nitrogen,	,,	179	
Inorganic Salts, Phosphates and Alkali,	,,	1,972	
Total,	lbs.		44,800

The modern discoveries to which we have just begged the attention of the reader, authorize us to state with confidence, that in the 44,800 pounds of manure just submitted to his appreciation, there is not in reality more than 2,150 lbs. of essentially useful matters in salts and nitrogen; and again of these same elements, soils in general contain naturally in superabundance, some one or more, any addition of them being quite superfluous. It is of little importance under what form plants receive these elements, provided that by one means or other this amount of essential food is placed within reach of the vegetable digestion.

Thus it will be easily conceived that we might have dispensed with the labor and transport attendant on about 42,000 pounds of the original 44,800 pounds of manure applied!

Having now sketched, as briefly as possible, the principles of manures, and shewn that the same fertilizing effects may be produced by the application of comparatively minute quantities of salts, we shall now return to the consideration of the plant which occupies us—the sugar-cane; and endeavour to show the fitness of compound concentrated manures to its culture. In doing so, we shall have to offer some remarks on the speciality of the cane itself.

The sugar-cane borrows from the atmosphere and water the greater part of its elements. The admirable experiments of M. Peligot, and other chemists, have demonstrated that this plant, as generally found in the West Indies, and we may add in Mauritius, contains about three-fourths its weight of water; its composition is according to him,

Water, ...	72·1
Sugar, ...	18·0
Woody fibre and Inorganic salts,..	9·9
	100·0

The precious salt of the cane, the sugar itself, is an atmospheric production, and is composed in 100 parts, of 41 parts of carbon and the elements of 59 parts of water. As to the portion to which it is indebted to the soil, (although equally essential to its prosperity, as the atmospheric elements,) it is but very minute, and may be stated at from 1 to 1¾ per cent. of the weight of the cane, in mineral and earthy salts. These salts differ in quantity and quality in the different parts of the same cane. The juice contains according to the same author in ℔s. 1,000, viz:—

Sugar, ...	℔s.	209·0
Water, ...	,,	771·7
Mineral salts, ...	,,	17·0
Organic matter, ...	,,	2·3
	,,	1000·0

The inorganic elements of the Otaheite cane, according to careful analyses made in Mauritius, after the methods laid down by Will and Fresenius of the Grissen laboratory, are as follow:—

Silica, ...	47·75
Soluble matters, ...	32·35
Phosphate of peroxyde of iron, ...	4·45
Phosphate of Lime and Magnesia, ...	3·95
Carbonate of Lime, ...	4·10
Magnesia, ...	3·90
Carbonaceous matter and loss, ...	3·50
	100·0

The Soluble matter contained

Sulphuric acid combined principally with Potash,	8·40
Carbonic acid combined with Potash and Soda,	1·10
Phosphoric acid combined with Potash,	0·85
Chlorine in combination with Soda as common salt,	4·00
Gelatinous Silica in combination with Potash,	2·55
Potash,	10·05
Soda,	2·65
Loss,	2·40
parts,	32·00

It is to be remarked in reference to cane analysis, that in no two canes were the same quantities of elements found. In some, the quantity of magnesia exceeded the lime, in others, the quantity of silica amounted to 65 per cent. The different parts of the same cane afforded variable elements. Young canes were found to be particularly rich in soluble salts, canes on new lands contained much more soluble inorganic elements than those produced on old lands. The beautiful law of substitution in vegetable nutrition first pointed out by Liebig, was constantly to be remarked in these researches. Canes from the known best estates in Mauritius constantly gave large proportions of silica, and less soluble and deliquescent salts than those from inferior soils. The analysis of the canes of Bengal remains still to be made, and merits every attention. In all cases the proportion of nitrogen is remarkably small for so large a plant.

If the reader will have taken the trouble to fix his attention for one moment on the above analysis, he will not have failed to remark, that this plant requires not only one or two, but several inorganic elements from the soil; and when it is borne in mind that plants do not come to perfection, if even *one of their elements be absent, it will be at once perceived that the administration of any single substance, however* excellent in itself as a fertilizer, can never be depended on in practical agriculture. To this fact may be attributed the occasional failures recorded with even the best fertilizers. There is but one principle on which we can depend in composing special manures, and that is to combine them so as to offer every constituent which the nature of the plant of which you desire the prosperity, may require from the soil. "Many "conditions are necessary for the life of plants," says Liebig, "those of each genus require special conditions, and should "but one of these be wanting, although the rest be supplied, "the plants will not be brought to maturity." In this point of view the planter has not to occupy himself with details of analyses of his soils, however useful and recommendable such examinations may be.

The sugar-cane differs in many respects from all plants in ordinary cultivation, and can hardly be compared with any of them; it is cultivated for its *stem*, and not for its seed. To give the greatest possible development to the former is the principal object of the agriculturist, and the quantity of manure which may be applied with profit in its culture, involves a question which has not yet been resolved. Too great luxuriance in the stem or straw of the cereals is known to be prejudical to the produce in seed, too much manure may be given to them. Whilst the principal object of the farmer in Europe is the fixation of nitrogen for the food of man and animals, the fixation of carbon becomes the principal care of the sugar planter. The latter object is best fulfilled by alkaline manures. The quantity of sugar in the cane admits of augmentation by the methods of manuring employed. This fact may be verified by any one who will take the trouble, (in lower Bengal particularly) of comparing the juice of canes grown on good stable manure, and that grown on the same field, without manure.

This noble grass, the sugar cane, when placed in favorable circumstances, that is in a soil rich in its proper salts, and containing sufficient humidity, exists several years, yielding annually its precious crop. These conditions may be produced artificially by irrigation and manures. In Mauritius, cane fields may be seen which have endured 16 to 20 years. The sugar cane is susceptible of acquiring a length of 15 to 20 feet.

A cane may be seen in the museum of Monsieur Geneve at Mauritius, measuring 21 french feet in length. The sugar cane is capable of yielding five, six and upwards tons of sugar in one crop and one acre of surface, exclusively of after crops. In all cases of these extraordinary products, the presence of large quantities of fertilizing salts existed in the soil either naturally or artificially, as in the case of new lands loaded with the vegetable debris of ages. In one instance we find a notice of extraordinary produce from a field of canes which had been flooded during a hurricane, and the debris and humus of a neighbouring forest strewed over the field.* Large produce was obtained in one instance from the application of 120 cart loads manure per acre aided by constant irrigation.† In this case the first crop was six tons per acre, the second crop two and a half tons, the third crop one ton, the soil in this instance was considered of very ordinary quality, and in a district not remarkable for its fertility. We have heard of eight tons of sugar per acre, but the above instances we have selected from well authenticated sources.

These instances are given in illustration of the immense productive powers of this plant when placed in favorable circumstances. The soils of Bengal are inferior in staple and quality to those of Mauritius, besides having been much longer under cultivation, larger quantities of fertilizing matter would be requisite to produce a given effect in the former than in the latter; in return, such matters are procurable much cheaper in Bengal than in Mauritius.

---

* Mr. Geneve at Black River, Mauritius.

† Captain Lesage, Moka, idem

This power of augmented production when placed in favorable circumstances possessed by the cane, has not yet received the attention which it deserves on the part of sugar planters, who have too often preferred an extended surface of sorry, scrubby plantations, to a limited extent of highly cultivated and productive canes. It is our object to call attention here to the possibility of effecting this great improvement, by employing, when the stables cease to furnish their supplies, artificial salts specially compounded in reference to the plant we desire to cultivate.

In reviewing the nature of the sugar cane, and the faculty which it possesses of producing during a series of years; the rational method for its culture would be, to furnish *annually to the soil* a portion of nutritious salts, equivalent to that which we remove in the crops. Under this treatment soils would be inexhaustible. By these means it is possible to maintain the same plantations, if not in perpetuity, at least during several years, and thus effect a most important economy in labor, consequently in the price of production, and eventually enable the European planter in Bengal to produce his cane as cheaply, in all probability, as the native cultivator. Aided by irrigation in the dry districts of Bengal, this great improvement presents no practical difficulty. In the humid districts of the country the salts alone would effect the purpose. This practicability of sustaining the same plantations by the periodical restoration of the fertilizing principles of soils, forms one of the leading points to which we beg to call the attention of planters, as being calculated to effect the most important influence on the cost of production of the staple in question. On this occasion, and in support of our views, we may cite the opinions of the illustrious Liebig, who says, "we may maintain the fertility of soils "in the same state, by compensating every year the loss "which we occasion them; but it is only in giving more than "we take away that it is possible to augment the fertility of "the soil, and in consequence the produce of the plants cul-"tivated on it."

It will be borne in mind, that in endeavouring to point out the suitability and advantages which artificial manures promise to the cultivator of the sugar-cane, that we do not come to announce any new invention; but solely to propose the application, in colonial practice, of some ameliorations the happy effects of which, in European agriculture, it is impossible to deny, in the increased crops and in the general aggrandisement of private fortunes. And when the cane planter reflects for one moment that every augmentation of his produce, over and above his ordinary charges of production, may be looked on as clear profit, he will at once admit that the subject of special manures is one which merits his most serious examination. We do not fear to repeat that modern science, in unveiling the true action of ordinary manures, and in indicating that these substances may be replaced and the same fertility produced by the employment of comparatively homœpathic quantities of matters containing the same essential principles, has thus, in rendering the most important service to agriculture in general, opened out resources more especially applicable to colonial property.

When the planter recollects that any means which would enable him to obtain from an acre of canes an augmentation of only half a ton of sugar, would admit of the profitable investment of at least £6 in manures, he will at once admit the importance of special manures, which may be obtained and employed at an expense of a few shillings. Here is the estimate.

10 Cwt. of sugar at 24*s*... ..	£12	0	0
Deduct for charge of manufacture one-third the value of produce,	£4	0	0
Balance in favor of manure,	£8	0	0

The inference to be drawn from this simple calculation we leave to the appreciation of our readers.

We shall now endeavor to show that the position of the sugar planter demands more imperiously the aid of artificial manures than that of any other agriculturist.

The economy of manures forms the very essence of improved European agriculture. To carry out his views the agriculturist has recourse to rotations, in which he employs plants which require, either different elements from the soil, or in less quantity. Plants are classed under three heads, according to the leading inorganic elements they demand from the soil, viz. potash plants, lime plants, and silica plants. Thus one plant absorbs from the manure those elements which another can dispense with, leaving to the profit of a succeeding race those constituents of the manure which it did not require in its organism. Rotations consist in fact in cultivating one or other of the above classes of plants with more or less skill and combination, all tending to produce the greatest quantity with the smallest expenditure of manure. When it is desired to obtain successively the same crops from the same field, recourse must be had to special manures combined so as to replace the same elements as have been removed in the preceding crop. Wheat has thus been made to succeed wheat—a problem hitherto unresolved. The position of the sugar planter is in the same category.

It is admitted as a principle in European farming that the number of animals to be maintained should be in ratio to the extent of land to be cultivated, and so that a sufficient quantity of manure should be produced to admit of fertilizing the same fields with a certain proportion, say 20 tons, every three or four years, according to the rotation adopted. Now let us examine for a moment the ordinary position of the sugar planter. In reviewing his operations, we observe an absence of all those combinations which tend to the production of manure and to eventual economy in its employ.

He cultivates a hungry silica plant, requiring either new lands, naturally very rich in salts, or the aid of large doses of manure. He cultivates but *one* plant, and demands consequently, the same elements continuously from the soil.

If we suppose a sugar estate cutting annually 600 acres of cane to make 500 tons of sugar; such a property would not, under the usual circumstances of management, possess a greater number of cattle than what would be strictly necessary for the purposes of transport, (for we do not suppose the existence of the inefficient cattle mill on such a property;) the manure of these animals would not be adequate to the effective manuring of more than 30 or 40 acres, *i. e.* for about *one-seventeenth part* of the plantation, or a manuring every seventeen years! Such a system of culture, applied to a gigantic grass, susceptible as we have stated of yielding a hundred tons of vegetable matter from one acre, and in one year, is entirely erroneous, and can only lead to the complete exhaustion of the soil, and the eventual decadence of the whole property,—decay, arrested only by the different circumstances of depth or natural fertility of the soil. And if, in spite of the lassitude and impoverishment of the soil, it is again tormented in successive years with the same crop, it can only yield the most wretched harvest, extorted at the expense of great efforts and outlay in labour.

It will appear evident that in the ordinary routine of plantership, recourse cannot be had with profit to rotations of crops. That the education of animals is incompatible with the march of a sugar factory. That sufficiently extensive accumulations of ordinary manure and its periodical distribution, involve almost impracticable details. That the soil, in most cases, limited in extent, and called upon incessantly to produce like a machine—always sugar. It will be evident we repeat, that artificial manures can alone fulfil the conditions required by the cane planter. Bengal more than other countries, it will be found, possesses abundant resources for their combination. All the elements of Guano, ammoniacal salts, phosphates, silicates and alkalies are ready to our hand, independently of foreign importation, on terms which, on the contrary, would admit of supplying the wants of less favored countries. It is necessary that some one should occupy themselves in their proper combination.

We possess no data whatever to guide us in an enquiry as to the probable profit which might be expected to arise from the application of manures to the culture of the Otaheite sugar-cane in Bengal.[*] In the absence of such information, we may with advantage refer to estimates made in Mauritius. Different soils and climates will necessarily modify results, and we must leave it to the intelligent reader to make his own application of the calculations to which we wish to call his attention. In England, the price of farm-yard manure may be taken at from six to ten shillings per ton, exclusive of the charges of transport and application on the field, and the farmer is satisfied if the capital employed in manures, whether from the farm, or artificial sources, such as alkalies, ammoniacal salts, guano, &c. &c., returns 10 per cent. interest on the outlay. It will be found that the sugar culture offers an immeasurably superior field for the profitable application of capital under this head.

It has been calculated that in Mauritius, an acre of land of medium quality, still capable of producing a crop of sugar cane, although partially exhausted by previous crops of the same plant, will produce, *without manure*

viz. 2,000 lbs. (French) of sugar in 1st crop.
1,000 ,, ,, ,, 2nd ,,
500 ,, ,, ,, 3rd ,,

Total, 3,500 French pounds of sugar in 4 years.

---

[*] We refer throughout these pages to the Otaheite, or Mauritius variety of cane.

A similar acre of land, aided by twenty to twenty-five tons of stable manure, would produce

viz. 3,500 lbs. (French) of sugar in 1st crop.
1,750 ,, ,, ,, 2nd ,,
875 ,, ,, ,, 3rd ,,

Total, 6,125 lbs. sugar in 3 crops and 4 years.

Difference due to the influence of manure is 2,625 French pounds of sugar. The value of which, at 24 shillings per 100 lbs. French, is .. .. £31 10*s*.
Deduct one-third for the charge of manufacture, .. 10 10*s*.
leaving £21 to the planter for outlay and profit on the manuring. This is without irrigation, which is rarely employed in Mauritius, but which would enormously increase produce could recourse be had to it.

Making full allowance for the superiority of the volcanic soils of Mauritius over those of Bengal, and greater fitness of the climate of that Island to the sugar-cane, it is probable that the following economic calculation might be made for the middle provinces of Bengal; moreover, we leave it to those who may be better informed, or who may be in possession of special documents, to rectify for themselves the base which we have assumed. We merely desire to arrest attention, and seek investigation as to the improvement which may be effected in cane cultivation by manures. One acre of land* of good quality, and taken after a suitable native crop of a non-silica plant, cultivated with the Mauritius or Otaheite variety of cane, irrigated, but unaided by manure, would probably produce 1,400 pounds of fair brown sugar in one crop and in one year. The same soil and surface aided by from twenty to twenty-five tons of mixed bullock and other manure, or its equivalent in artificial manure, say 8½ cwt., and likewise irrigated, should yield, viz :—

---

* Throughout this pamphlet we have preferred employing English weights and measures to the variable Indian maund and beegah, for obvious reasons.

In first crop, muscovado sugar 3,200 lbs. and about one-fourth of this amount, or 800 lbs. in a second crop; which supposes that in consequence of the energy given to vegetation by constant irrigation, nearly the whole useful effects of the manure are expended in the first crop, and that no fertilizing salts have been added after the removal of the crop-process we have recommended as being the proper method of cultivating this plant.

Total produce in two crops and two years is 4,000 lbs. We have therefore an augmentation of produce, as compared with unmanured land, of 2,600 lbs. of sugar, due to the fertilizing influence of the manure, and representing at 24 shillings
per cwt. £27 17 0
From which deduct ⅓ for charge of manufacture, 9 5 8

leaving £18 11 4
for profit and employ of capital in manuring.

In reference to natural manures, it is of course understood, that it is not a question here of proposing to supplant them by artificial compounds, quite the contrary, every effort should be made consistent with economy to augment their production by every possible means; their fertilizing effects may be considerably enhanced by the addition of concentrated fertilizers and the consumption thus economised. The benefits of artificial manures will be principally called into action after the store of ordinary manure is exhausted; with the advantage, that from their portability they may be applied to the whole extent of plantations immediately after a crop, so as to re-fertilize every impoverished field.

But even if the necessary quantity of stable manure could be procured *gratis* for such an extended application as is above supposed, it would cost an estate more to cast it on to the land and apply it in the cane holes, than would the whole cost and charges of application of a concentrated fertilizer. Moreover, the application of ordinary bulky manures to the extent of 4 or 500 acres of plantation is a totally impracticable manœuvre. If we assume the cost of artificial manure at 30 rupees per ton at Calcutta, and actually delivered on the sugar estate at 40 rupees, the cost of 8½ hundred weights, (the quantity equivalent to 25 tons of farm-yard manure,) the expense would be 17 Rs. or £1. 14*s*. which we have to deduct from the £18. 11*s*. 4*d*. the sum above found as the approximate benefit accruing from a certain quantity of manure applied to the sugar-cane, representing an amount of profit which no other amelioration yet brought under the notice of the planter is calculated to realize. We have not carried into account the expense of application, for the reason that, unlike bulky manures, it requires no additional labourers or transport animals to those in ordinary employ; that canes sustained in rich vegetation require practically less weeding, &c. &c. It is not unimportant to remark in this place, that soils rich in fertilizing principles, and therefore in a state to produce a healthy and vigorous vegetation, are not infested with destructive insects. The moment soils become exhausted or deficient in any one element necessary to the existence of the cane, from that instant the borer grub commences his ravages, and poor, unprofitable canes are alone produced. Insects are an effect, and not a cause. The application of a small quantity of a powerful fertilizing salt, such as guano, or sulphate of ammonia, &c. around the roots of an infested cane hole, in giving greater vigor to the vegetation, at the same time drives away the pest. An experiment made by us, in reference to white ants, also leads to the belief that this pest will not touch canes manured with concentrated salts. In a piece of ground infested with white ants, the cane plants on ordinary stable manure were devoured immediately. In the holes in which the salts were employed, the canes vegetated and were saved.

Mauritius cultivates about 80,000 acres of cane, of which 60,000 acres are cut to make a crop of 40,000 tons of sugar one year with another. Now it has been estimated, in calculations made referring to the influence of concentrated manures on the agriculture of that colony, that, if by any means it were made practicable to produce only *one single cane more* per cane hole, than there actually exists, that this simple amelioration would effect an augmentation of more than 20,000 tons of sugar in the annual crop; that is, an improvement of about 50 per cent. in the produce and resources of the colony, taking the annual produce at 40,000 tons.

Here is the proof: 60,000 arpents or acres of plantations, each acre containing 3,500 cane holes, give 210 millions of cane holes, and consequently an equal number of canes; these canes, at the moderate calculation of three pounds weight each, would produce at the rate of 15 cwt. of canes to the cwt. of sugar, 21,000 in place of 20,000 tons as we have stated. But the amelioration practicable by artificial manuring, is capable of effecting a much greater agricultural revolution than what we have above supposed, from its tendency and influence in economising the price of production.

If the reader will for a moment but make the application of such a calculation to Bengal, he cannot fail of being struck at the magnitude of the prospect which that country opens. It would not perhaps require more than one-fourth of the surface of land actually employed by indigo in Bengal, to supply the present consumption of sugar in England. Happily the field is not likely to be limited. The disposition evinced in England, and in fact in Europe, to untrammel the commerce in sugar, opens an almost boundless field for competitors.

The fertilizing effects of twenty tons of farm manure as applied to the sugar-cane, may be produced by eight hundred weight of compound salts made special to the plant in question. If it be desired to apply 40 or 60 tons, that is, give a double or triple manuring, it will be necessary to augment artificial fertilization in the same proportion. Experiments should be made even on the smallest scale on native cane fields, by those who may not have plantations of their own, to be assured on one of the points on which we have endeavored to fix attention, that is, the practicability of enhancing the value and produce of Ryotty cane cultivation to mutual advantage. To indigo planters, already surrounded with native cane cultivators, we believe these views are calculated to open a new and most important field of operations.

The humid districts of Bengal present advantages for the culture of this essentially water-loving plant, which perhaps have not been sufficiently appreciated. Attention seems to have been more generally directed to the sugar culture in the drier districts of Bengal than elsewhere. The inundated districts of the country, however, it should be recollected, present the same conditions, and all the advantages for the growth of the sugar-cane possessed by Demerara—the most productive of the British sugar colonies. By the employment of embankments as in the latter colony, the richest tracts of alluvial soil, (now under crops of rice) could be placed in the necessary condition for the sugar-cane: the periodical inundation being kept out or let in occasionally on portions to restore fertility. The annual fall of rain in lower Bengal is not so great as in Demerara.

The great facility with which a sufficiently extensive tract of such land might be procured within a ring fence, and with economy of outlay, are all circumstances which merit the attention of the sugar planter. Those elements of the soil which exist in the dry provinces, and which give them their present superiority, may be added artificially, and thus bring forth the full advantages of the humid climate.

The method of employing the artificial manure is so simple as hardly to require notice. Having determined the quantity of manure to be employed per acre, whether the equivalent of 20, 40 or 60 tons, the labourer is to be furnished with a tin measure (or bamboo joint) containing about one quarter of a pound. This quantity, (supposing the acre of land to be holed at the rate of about 3,500 holes,) per cane hole will represent the equivalent in fertilizing power, of 20 to 25 tons of the ordinary dung heap per acre; two measures, 40 to 50 tons, and so forth. The fertilizing salts should be carefully mixed up with 8 or 10 pounds of the soil itself, taken in or from around the cane hole. We assume here planting in holes, not in drills. Experience has proved the former to be superior to the latter. The hole forms a little reservoir, in which nutritious matters tend to deposit themselves. The drill, in heavy rains, becomes a canal lending itself to the washing out of the most valuable portions of the soil or manure. It is not our place here to enter on any of the practical details of plantership, our task alone is to call attention to the extent of aid which the planter may in reality derive from artificial manures. It is not indispensable to deposit the salt before planting, as cane plants contain sufficient elements within themselves to sustain the life of the young plants to a certain stage, when aided by humidity, either natural or by irrigation. The facility of application of a concentrated manure, moreover, is such, that it allows the planter to select the most favorable moment of the season, and so as not to lose by volatilization an atom of its efficacious principles, an inconvenience inseparable from ordinary farm-yard manure from its nature, mode of collection, and employ, sometimes in good and sometimes in the inert season.

An agricultural compound salt, such as we propose, will remain in store without injury until the favorable moment for its application arrives. We recommend the application of artificial manure with the first weeding and hoeing at the commencement of the rainy season, and when the young plants have already acquired some development; and that the quantity of manure be applied at *twice or even thrice,* in preference to applying the whole dose in a first application, and at intervals of a month or six weeks according to the judgment of the planter, and his operations of weeding and stirring the soil around his plantation.

In reference to rattoon canes of different ages, the artificial fertilizer should be applied as soon after the removal of the crop as possible. The field being cleaned by burning off or otherwise, it should be deposited in the intervals of the cane ranks as it were broadcast, hoed into the soil, and irrigation employed (in the dry districts,) so as to dissolve and impregnate the soil and bring into immediate energy the fertilizing principles. An immediate crop will start forth with renewed vigor from the soil when such means are employed. The older the crop, and the more exhausted the soil, the larger the quantity of salts must necessarily be employed to produce a given effect. Let it always be borne in mind, that with the plant in question, cultivated for its stem, as we have stated, the quantity of produce bears a ratio to the quantity of nourishment afforded it. Experiments are requisite to decide to what extent manures may be profitably employed in the culture of this plant—a question, the examination of which is well worthy the attention of the Agricultural Society, and of individuals interested in resolving the important problem. We have already alluded to the immense produce, which this plant is susceptible of yielding when placed in presence of abundant nourishment. The atmosphere is ever present, and ready to furnish the greater part of the necessary constituents. It is the part of the cultivator to supply the element of water, where that is insufficient, and the minute portion demanded from the soil in order to complete the productive cycle.

We have now to call attention to the relative value of different Colonial crops, as showing in another point of view, the peculiar fitness of artificial manures to the culture of the sugar-cane.

Value of the produce of one acre of Indigo, at the rate of 15 lbs. of Indigo per acre, and at 5 shillings per pound, ...	£3	15	0
Idem of one acre of cotton, at 1½ hundred weight per acre, and at 4 pence per pound,	2	16	0
Idem of one acre of coffee, at 2 hundred weight per acre, and at 42*s*. per cwt., ..	4	4	0
Idem of one acre of sugar-cane at 1½ ton sugar per acre, and at 24*s*. per cwt. ..	£36	0	0

The above estimates will serve to show, that the sugar-cane can support an expence in manuring, which perhaps no other plant, except coffee, could bear. The latter plant, coffee, we are aware, does admit of immense augmentation under the influence of fertilizers.

On the advantages which Bengal possesses as a sugar-producing country, we shall not here attempt to dwell. Recent events at home show the strong bias which exists to the admission of the staple in question on the most liberal commercial principles, a tendency which moreover we may expect to see extended every day, even to the destruction of some of the oldest and hitherto most cherished interests, to place this staple in fact in its proper position, not as a luxury, but as a valuable nutritious necessary of life, to be placed within the reach of the greatest possible number. Viewed in this light, the sugar commerce presents a vast field indeed, and on which we are as yet only on the threshold. The most favored country must be prepared for competition. The most effective remedy to meet this competition is, without doubt, production at the lowest possible price. To produce at a low price, the planter must be ready to avail himself of all the improvements which the daily progress of science lays open to him. The West India Colonies are now fully awake to the valuable aids to be derived from the application of improved machinery in the manufacture, and of manures in the culture of their staple product; to the latter department, we have dedicated these pages. To remain behind in this onward progress, is to abandon every thing. Before engaging in the improvements to be made through the aid of machinery, always involving a large outlay of fixed capital, the planter should enquire into the improvements to be made in agriculture, to diminish labor, and maintain at the same time the revenue on the same footing, by sustaining the fertility of his soils, and even augmenting their productive powers; by counterbalancing, by increased produce, any diminution in the market value. These are the results to which the views we have endeavored to trace out are calculated to lead, by permitting the culture of the cane on the largest scale under the known fertilizing influence of manures; by maintaining the plant several years on the same soil; in augmenting the returns of each crop without a comparative augmentation in expenses; in preventing the exhaustion of the soil, which the nature of the sugar culture tends unceasingly to occasion; by permitting the planter to avail himself with redoubled advantages of that most powerful engine of cheap and extensive production, the special privilege of Bengal, a ryotty cultivation, promising the most favourable results to the European planter, and the aggrandizement of the industrious native farmer.

The application of the principles we have endeavoured to trace, presents in fine, one of those innovations destined to effect a revolution in the future management and value of sugar property, more than any amelioration, which we believe, as yet been offered to the consideration of the planter; it is calculated to exercise an extensive, rapid, and efficacious influence on the economical production of the staple in question, and in enabling him to compete with advantage against a foreign competition in the metropolitan market.

Correspondence regarding the experimental Cotton cultivation in Rungpore, with a few remarks on the staple products of that District.

(Communicated by the Government of Bengal.)

To James Hume, Esq., *Secretary Agricultural Society.*

Sir,—By direction of the Governor of Bengal, I have the honor to forward, for the Society's use, copy of two communications from the Secretary to the Sudder Board of Revenue, with enclosures, on the subject of cotton cultivation in the district of Rungpore. The specimens alluded to in Mr. Plowden's letters of the 14th November and 7th February last, are likewise transmitted.

No. 434 of 14 Nov. 1844, with Enclosure No. 54 of 7th Feb. 1845, with Ditto.

I am, &c.

Cecil Beadon,

Under Secretary to the Govt. of Bengal.

Fort William, 12*th March*, 1845.

To F. J. Halliday, Esq., *Secretary to the Government of Bengal, Revenue Department.*

Sir,—I am directed by the Sudder Board of Revenue to submit herewith, for the consideration and orders of the Right Honorable the Governor of Bengal, a letter in original, No. 206½, dated 10th ultimo, from the Commissioner of Moorshedabad, and the three specimens of cotton from Mr. Terry, the Government Planter in Rungpore, which accompanied it, together with an extract on the subject from the Commissioner's Operation Report for the past year 1843-1844, and a copy of Mr. Terry's Report therein referred to.

Mis. Dept. Present J. Pattle, and J. Lowis. Esqs.

I have, &c.

(Signed) George Plowden,

Offg. Secretary.

Fort William, 14*th November*, 1844.

Extract, paragraph 7th of a letter from the Commissioner of Moorshedabad, to the address of the Sudder Board of Revenue, No 206, dated 10th October 1844.

Experiment in cotton planting in zillah Rungpore under Mr. Terry.

Para. 7th.—The only remaining operation now in progress is the experiment in Rungpoor with regard to the capability of the soil for cotton planting under Mr. Terry, an American; the orders of Government limit very closely the actual experiment, but it appears to me impossible to arrive at any thing like a satisfactory result without more extensive experiments. No doubt the experience of Mr. Terry may enable him to form a guess as to the capability of the soil from inspection, but nothing approaching to satisfactory or conclusive information can be obtained without experiments of some extent. I intend visiting Rungpoor shortly, when I shall be able to confer with Mr. Terry and the Collector on this subject. The reports hitherto received seem to show that Mr. Terry entertains a favourable opinion of the soil in some parts of the zillah; the circumstance noted by the Government in a communication received from the Board that cotton is grown to a greater extent in Dinagepore than in Rungpoor has been pointed out to him; he states that the progress made by the plant he has already sown is satisfactory, and he seems sanguine as to the result. The Collector, Mr. Dick, is disposed to give every assistance in his power to carry out the object which the Government have in view; and has even advanced money to this end on his own private responsibility. I annex a report very lately received from Mr. Terry; he finds that the Mexico seed which has been distributed already in Rungpoor by Mr. Bonnevie has led the natives to prefer it to the indigenous cotton, and proposes that advances be made to the ryotts to induce them to cultivate this seed; the seed being also supplied to them. I think this will be found the best plan, and would advise that experiments be made in the localities chosen by

Mr. Terry, of not more than 100 biggahs in one spot, to such extent as the Board may approve; an arrangement may be easily made with ryotts, which will be more economical than a home cultivation, and the ryotts will further have the benefit of Mr. Terry's instruction in the management of it, while at the same time he may himself acquire a knowledge of the seasons and soils of the district in communication with them: by this means we shall obtain a sufficient supply of cotton, to enable us to judge of the propriety of carrying the experiment further, and Mr. Terry will be enabled to report more fully, and to speak with more confidence on the subject for the investigation of which he has been appointed. I send, in a separate package, three specimens of cotton, which Mr. Terry wishes to be laid before the Honorable the Governor; one of country cotton, grown at Mitapoker, another of cotton grown from Mexico seed at the same place, and a third grown in the Bhootan hills, coarse in fibre, but the bowls of which are the largest Mr. Terry has seen in any part of the world, shewing, in his opinion that the soil is well adapted for the plant, and that Mexica seed might be equally productive of a good cotton; it woul be advisable that an experiment should be made on this soil

To A. Dick, Esq., *Collector of Rungpore.*

Sir,—In continuation of my letter, No. 20, of the 16t ultimo, I beg to inform you that I found the lands on th banks of the river Ghangut high, but not very rich, bein mixed too much with white sand. The best places I saw o the stream was Ootun, Barregurree, and Bhetgurree; the soil at the above named villages is black clay, with a black san very like the soils in the station of Rungpore. I see th natives grow in every village more or less of the perenni cotton, the plants are very large, and now full of bowls; th bowls are very small, though the wool is very fine; the ryot grow this cotton about their houses and yards. I have see some plants 8 or 10 feet high, and propped up with bamboos to keep them from falling down. I beg to add, that in my travels I heard that there was a quantity of the annual cotton grown at Meetapooker about 14 miles from the station, and seven miles from the river; the soil there is black sand and clay. I had the pleasure to find it grown in abundance; the ryotts plant some with indigo, and of course the cotton has no chance until the indigo is cut off, and of course it cannot make much, though they plant some with chillies and ginger; and as they do not plant them so thick as indigo, the cotton has a better chance, and as they weed and keep the chillies and ginger clean, the cotton is much better. I saw some cotton in their chilly fields 6 or 7 feet high, and very full of bowls; the bowls on the annual plants are larger than the perennial kind, though the wool is coarser and shorter. I was unable to ascertain how much they reaped per beegah from Meetapoker. I went to a village called Muckerampore; here they also plant the annual to some extent; the soil is black clay and sand. I here found two or three ryotts growing the Mexican cotton from some seed that Mr. H. Bonnevie got up from the Agricultural Society several years ago,* and induced them to plant it, by reducing their rent two rupees; and now they have got it, they find it more profitable to them than the indigenous cotton of the country, as they acknowledge themselves. The field I saw was about half a beegah, the plants were three years old, and the ryot told me that he collected enough from it to clothe himself and family, five or six in number; and sold some in the market. I have forgotten to add, that his plants have a good lot of bowls on them, and he had collected a good deal of cotton from them this season; I also gave him some seed in May last: he planted it late; the plants are small, yet they have some fruit on them. I beg to add that the ryots are all willing to plant the Mexican cotton, provided they get an advance for doing so; and I think if Government would give them a little encouragement, it would be the means of the Mexican cotton being spread through the country, as the ryots themselves acknowledge, who have cultivated it, that it yields a larger profit than the cotton of the country; should Government be pleased to advance the ryots to cultivate, I would wish it near the station of Rungpore, so that I can look after it, and see that the plants get justice done them.

---

* This seed was probably a portion of the supply brought out by the late Capt. Bayles, Supt. of Cotton Plantations. It was placed at the disposal of the Society by Government in March 1841, and distributed immediately over all parts of the country.—*Eds.*

I am, &c.
(Signed) F. J. TERRY,
Rungpore, Oct. 2nd, 1844. *Govt. Cotton Planter.*

I have quite forgot to add, that I gave seeds to as many ryots as would receive them; they promised to plant them agreeable to my instructions, and I also gave Mr. Rehlling some seed at Bhetgurree, which he will plant immediately, and has promised to let me know how it turns out.

From the Commissioner of Revenue, 14th Division, Rajshahee, 10th October, 1844.

To the Sudder Board of Revenue, Fort William.

No. 23, dated 2nd Oct. to the address of the Collector. No. 24, dated 2nd Oct. No. 25, dated 2nd Do.

GENTLEMEN,—I have the honor to forward in original three letters from Mr. Terry, American cotton planter at Rungpore, which have been received with three different specimens of cotton grown in Rungpore; I have referred to these specimens in my operation report of the 10th instant, No. 206.

I have the honor to be, &c.
(Signed) W. JACKSON, *Commissioner.*

No. 23.

To A. DICK, ESQ., *Collector of Rungpore.*

SIR,—I beg to forward to you one bowl of cotton that I got in my travels, and beg the favour of your forwarding it to Government. This cotton was grown in the Botan Hills; the wool is coarse and short, though the bowls are larger than any I have ever seen any where in the world. I think if a better seed was introduced, then a better cotton might be produced, and probably to great advantage.

I am, &c.
(Signed,) F. J. TERRY,
Rungpore, Oct. 2nd, 1844. *Govt. Cotton Planter.*

No. 24.

To A. DICK, ESQ., *Collector of Rungpore.*

SIR,—I beg to forward you a small sample of the annual cotton that I got out of a ryott's field at Meetapoker; the wool is coarse and short, though the plants are of good size, when you take into consideration the manner in which it was cultivated.

I am, &c.
(Signed,) F. J. TERRY,
Govt. Cotton Planter.
Rungpore, Oct. 2nd, 1844.

No. 25.

To A. DICK, ESQ., *Collector of Rungpore.*

SIR,—I beg to forward you a small sample of the Mexican cotton, grown by a ryot in the village of Muckrampore; the plant that I got this from, was three years old.

I am, &c.
(Signed,) F. J. TERRY,
Rungpore, Oct. 2nd, 1844. *Govt. Cotton Planter.*

To F. J. HALLIDAY, ESQ., *Secy. to the Government of Bengal, Revenue Department.*

Mis. Dept. Present
J. Pattle, and J. Lowis, Esqs.

SIR,—In continuation of my letter, No. 434, of the 14th November last, I am directed by the Sudder Board of Revenue to transmit herewith, in original, for the consideration of the Right Honorable the Governor of Bengal, a report (No. 257, dated the 31st December,) from the Commissioner of Moorshedabad, together with its annexed copies of two letters from the Collector and Mr. Terry, respectively.

2. The Board observe with much gratification the interest taken by Mr. Jackson in the success of the cotton experiment in zillah Rungpore, and their thanks are due to him for the information he gives of the statistics of that district, as regards its production and the distribution of the produce; but they doubt whether it is derived from accurate sources, and can be fully depended on.

3. The Commissioner, it will be seen, proposes that small advances should be made to ryots of the district for the cultivation of cotton, in order to test the capabilities of the soil, and that the produce should be purchased from them, the re-sale of which he thinks would probably cover the whole outlay. The Board would recommend that the experiment be allowed, and they see no objection to its being conducted by the Collector, should ill health prevent Mr. Terry from superintending it.

4. The specimens of cotton, thread, and cloth referred to in the 5th paragraph of the Commissioner's letter, accompany.

I have the honor to be, &c.
(Signed,) GEORGE PLOWDEN,
Offg. Secretary.

Fort William, 7th Feb. 1845.

From the Commissioner of Revenue, 14th Division, Camp Bauleah, Zillah Rajshahee, the 31st December, 1844.

To the Sudder Board of Revenue, Fort William.

GENTLEMEN,—I have the honor to report, that in visiting Rungpore, from which place I have just returned, I took the opportunity of examining the state of the cotton cultivation under the American planter Mr. Terry, and of conversing with him and the Collector, Mr. Dick, upon the subject of extending the experiment. I found Mr. Terry just recovering from a severe attack of fever, and still in a weak state; he appears to be a keen, active-minded person, and willing to apply himself with energy to any practical experiment, but more adapted for making the experiment than for writing a detailed report on the result: he is now so far recovered as to be able to resume his journey through the country, and examination of the various soils in the district.

2. I found about 15 beegahs had been sown by Mr. Terry on various spots in the vicinity of the station: in most he has divided the patches, sowing part with the Bundelcund seed, and part with the Mexico; the Bundelcund plant grows higher, and more straggling; the Mexican plant is lower and more bushy, and produces, in Mr. Terry's opinion, more cotton; the quality of course is better and finer; I found at least half the pods, which I examined, had been attacked by an insect, and contained a caterpillar which destroyed the produce or rendered it unfit for use; the plants however looked well and thriving, and the produce was, in Mr. Terry's opinion, very fair in quantity and quality.

3. While at Meetapoker, about 14 miles south of Rungpore, I found that two ryotts in the vicinity had cultivated cotton from the Mexican seed, which had some years ago been given them by Mr. Bonnevie, one of the Government farmers, who had also reduced their rent to induce them to

buy it; about six cottahs were growing in Mokurrumpore and two or three cottahs in Gopalgunge. I talked for some time with Khodadel, an old ryott, who had the larger patch of this cotton; he shewed me some of the cotton, of the cotton thread, and a chudder or coarse cloth which had been made from this Mexican seed by himself; the chudder he had was worth about 12 annas, when a similar chudder from the native cotton was not worth above 8 annas, and I ascertained this to be the case; the thread too is stronger and more valuable; he did not grow the cotton as an annual, but let it stand on from year to year; that which he has, had been growing for eight years; it produces during about six out of the twelve months. As a proof that the produce is superior, his Mundal wished to raise his rate of rent by one-half, but this I took measures to prevent; he stated that the insect destroyed 10 out of 16 of the pods, and that it attacked the Mexican much more than the common country cotton; the land about Meetapooker is entirely the black low land; there is none of the keara or high light soil; which prevails, however, in Peergunge, about 12 miles off, and on the confines of Denagepore.

4. Mr. Terry agrees with this ryott in thinking, that clayey soil will not answer for the cotton so well, as it retains too much moisture; and although the land in which the experiment has been made about Rungpore is not clay, still it is of the black low kind, and I think it advisable that the experiment should be made in other distant parts of the district, particularly in the keara land, which is lighter and drier, though perhaps not so rich. I have therefore directed Mr. Dick, the Collector, to try ten or twelve beegahs in the Peergunge land, and that on the confines of Denagepore; also in some patches of land to the north of Rungpore, where the soil is also light; the most desirable, according to Mr. Terry, is a rich sandy soil. It is very plain, that no ocular inspection of the soil can give a satisfactory know-

ledge of its capabilities, which can only be tested by actual experiment; the best method is, by making a small advance to the ryott, as is done by the indigo planters, and purchasing the produce of him, insisting at the same time that the spot is to be given up entirely to the cotton, no other cultivation to be mixed with it, and the management of the field to be conducted according to Mr. Terry's plans, as far as possible. I have given directions to this effect to Mr. Dick. The sale of the cotton will probably cover the whole outlay, and it would be matter of regret to omit to test the capability of the Rungpore soil in an effectual manner, now that we have the advantage of Mr. Terry's practical knowledge to guide us.

5. I send a specimen of the cotton grown by the ryott at Meetapoker, of the thread made from it, and of the cloth, each of which the Board will observe is superior to the common country produce. I have no doubt the ryotts would willingly undertake the cultivation, on seed being supplied, and small advances made to them; the chief difficulty is the damage done by the insect. I have sent specimens of the damaged pods, containing the insect, to the Agricultural Society, and have requested the Secretary to endeavour to ascertain the natural history of the insect; and, if possible, to point out a remedy: it is evidently some fly, which deposits its eggs in the pod; these eggs become caterpillars, of a small brown description; perhaps it might be possible to keep the fly off by some application to the pod, or to time the sowing so as to bring the plant into pod at a season when the insect does not lay its eggs. Mr. Terry has sown his plant in May, which he thinks the best season; that sown in October will not, in his opinion, answer; but of this, I am not quite satisfied.

6. Mr. Terry thinks, that it would be desirable, if the cotton is hereafter cultivated extensively, to obtain seed direct from Mexico; the cotton known by the names of Up-

land Georgia, and New Orleans, is the produce of Mexican seed acclimated in those places; the seed is there renewed every five years in small quantities, which is grown at first on inferior land, merely for the sake of the seed; it does not bear cotton well for the first year or two, but when acclimated it is sown for produce; this circumstance should perhaps be held in mind, and the seed renewed in the same manner in India from time to time, otherwise it will no doubt deteriorate: unless obtained direct from Mexico, there can be no certainty whether it is actually fresh Mexico seed or not.

7. There is but little cotton at present grown in Rungpore; but the coarse Garrow cotton, as pecimen of which I sent the Board on the 10th October last, seems to thrive so well and to be so productive, that it would be worth while to give some of the Mexican seed to any one who would try the experiment with it, on the soil where the Garrow cotton is grown; if it will produce fine cotton in the same abundance as it does the coarse fibred material, the result would be highly satisfactory. I have directed the Collector of Rungpore to endeavor to effect this.

8. In making enquiries regarding the extent to which cotton is already cultivated in Rungpore, I learned that it is quite trifling, far from sufficient to supply the wants of the district itself, there is therefore no export of this article, but a considerable quantity is brought into Rungpore from Dacca, from Mirzapore, and some thousands of maunds from the Garrow Hills; there is no reason whatever why the cultivation should not be introduced; the natives have some superstitious objections to the introduction of any new species of cultivation, but this I apprehend would soon be got over if they found that it turned to their advantage; one or two would adopt it, and others would find it their interest to follow their example.

9. In the course of my journey to Rungpore, I was much struck with the apparent increase of the sugar cane

cultivation and the establishment of *golahs* in various villages, from which it is purchased by the Beparees and sent to the marts on the river Jenae, and thence to Calcutta and other large towns. I find that the sugar cultivation in Rungpore has more than doubled in extent within the last 5 years in consequence of the increased demand on the article; it was stated to me that 3,50,000 beegahs of cane cultivation are now to be found in Rungpore, chiefly in Pergunnah Boda, Kajeerhat, Surooppore, Koondy, Buttasun, Pyrabund, and Boroobheela: I have now by me a list of the various *golahs* or places where the best grained sugar *(chenee)* is first collected from the ryotts, with the capacity of each; there are no less than 94 *golahs*, capable of receiving 26,520 maunds; the whole quantity of sugar produced is stated at 50,000 maunds, but if the extent of beegahs under sugar cultivation above-mentioned is correct, the produce must be very much greater; however there is no doubt that 50,000 maunds* of sugar are produced, this being calculated on good data, whereas the extent of beegahs is, I suspect, a mere guess; the sugar being manufactured in various ways and of various qualities, the value of this cannot be taken at less than 4,50,000 Rupees; the profits are chiefly in the hands of the native venders, the ryotts being almost all in debt, and forced to sell at a low price, while they have to pay a ruinous interest for their debts. I am informed that a native manufacturer can produce his sugar at 5 rupees or 5 rupees 8 annas a maund, while the Europeans who have tried it find that it stands them in 7 rupees 8 annas a maund of 80 Sicca to the seer: there seems to be reason to believe that the proper mode of manufacture is not well understood in Rungpore: however, it is plain from the late increase in the cultivation, that the sugar fetches a remunerating price in Calcutta, though it is often sold there as Ghazeepore sugar. I have by me detailed accounts of the cost of production, *with which I do not think* proper to trouble the Board; but I have mentioned the state of the cane cultivation, because it shews that the natural direction of the cultivation of the district is to sugar rather than cotton.

---

* This 50,000 maunds includes only what is sent to the golahs.

10. The other staple products of Rungpore are *Indigo,* the cultivation of which is estimated at 1,20,000 beegahs, producing from 3,000 to 7,000 maunds of Indigo according to the season; three-fourths of this is produced by the European Planters, at for 115 to 160 Rupees a maund (say 130 average) worth 3,90,000 Rupees to 9,10,000 Rupees.

Rice, the extent cannot be given, but estimated at half a crore of maunds; *Turmeric,* 15,000 maunds at Rs. 1-8 to Rs. 2-8 per maund. *Ginger,* about 75,000 maunds at Rs. 4 a maund, is exported from the district; this export has fallen off lately, it amounted formerly to 2,00,000 maunds.

Silk, 500 maunds only, at from 7 to 9 Rs. a maund; this has fallen off, but is on the increase again.

Tobacco, this has much fallen off lately in consequence of the introduction of the Arracan and Tenasserim Tobacco. Not above one-half is now exported in comparison with former years, but it is still stated at 1,00,000 maunds, worth 2 Rs. a maund.

Hides and Gunny bags have lately been exported to a considerable extent; or from 40 to 50,000 hides, and 60 to 70 lacs of pieces of Gunny.

11. The Board will observe that the amount of these exports shews that the district of Rungpore, which gives a revenue of only 12 lacs of Rupees, is in a highly flourishing and improving state; the introduction of Cotton from Mexican seed would no doubt be a great source of profit to the people, but the experiment must be made by the Government in the same manner as the Indigo is cultivated by the Planters, and to such an extent as will satisfy the ryotts that it will answer and pay; they cannot be expected to abandon

their own staples, and to risk an experiment which is often attended with loss, until the proper method of management has been ascertained. I trust that the directions I have sent to the Collector, as above detailed, will meet the approval and have the sanction of the Board. I have, &c.

(Signed) WELBY JACKSON,
Commissioner.

P.S. Since writing the above, I have received a letter, dated the 3d. instant, from the Collector of Rungpore, from which I learn that Mr. Terry is again suffering from illness, and unable to proceed to the interior; and further that he does not think he will ever be able to endure the climate of Rungpore; under these circumstances further proceedings under his superintendence are at present impracticable, and either we must await Mr. Terry's recovery, or some other person can be sent in his place. I can still, if the Government do not object, order the Collector to make the experiments I have suggested, by making advances and giving seed to the ryotts in various parts of the district.

7th January, 1845.

Extracts from Reports on Cotton and on the Experimental Cotton Farm at Gorruckpore.

(Communicated by the Government N. W. Provinces.)

To the Secretary Agricultural Society, Calcutta.

Rev. Dept.

SIR,—I am directed by the Honorable the Lieutenant Governor to place at the disposal of the Agricultural Society, and for publication in their Journal, the accompanying extracts from Reports on Cotton, by Mr. Blount, the American Cotton Planter. I am, &c.,

Report dated 1st Oct. 1844, para. 1 to 5, do. dated 8th January 1845.

A. SHAKESPEAR,
Asst. Secy. to Govt. N. W. P.

Agra, 5th March, 1845.*

Extract from a letter from the Government Cotton Planter at Goruckpoor to the address of the Collector of Goruckpoor, dated 1st October, 1844.

Para. 1. I have delayed making a report on the Government experimental cotton farm under my charge at this station, for the reason that at different stages of the cultivation in previous years, the appearance of the plants has always been so flattering as to induce me to report favorably of the prospect, when the result has been, that my expectations have not been realized. I therefore thought it best to wait until I should be able to report definitely as to its success or failure for this season; and I now much regret to have again to report a total failure of the experiment at this farm.

2d. This season has been quite different from that of 1843; in that year there was rather a scarcity of rain; this season has been a very wet one, yet the result of both season's experiments has been the same; a failure. At the first setting in of the rains I had the old plants pruned, and they immediately threw out vigorous shoots, and judging from the quantity of flowers and young pods, promised to yield a most prolific crop, but as in the previous year's experiment, the fruit has dropped off before arriving at maturity. This has not only been the case with the American, but with every other description of cottons on this farm, with the exception of the Nurma and Kooklee cottons of this district, which I presume must require a peculiar situation or soil, for on the sandy soil of this farm it has not even blossomed.

3rd. The new plants of this season are very small, and have as yet shewn no disposition to produce, particularly the American, which will yield nothing.

4th. Five and a half beegas of American and Jubbulpoor cotton, which I planted on fresh land at the grant of Mr. McComish, has grown to a much larger plant than that on the farm at the station, but has been damaged so much by worms, that under the most favorable circumstances it can produce only a very scanty crop.

5th. The Bourbon and American cotton planted in February by irrigation, have both grown very large, but have not yet produced any flowers.

(True Extract,)

A. SHAKESPEAR,
Asst. Secy. to Govt. N. W. P.

To H. C. TUCKER ESQUIRE, *Magistrate and Collector of Goruckpore.*

SIR,—According to instructions received in a letter No. 4864, of 1844, from J. Thornton, Esq. Secretary to the Govt. of the N. W. P. to E. P. Smith, Esq. Commissioner Benares Division, dated Agra, 31st October 1844, directing me to visit every portion of this district to examine such cotton crops as I might see growing; to give instruction regarding the cultivation of the plant here, and to furnish a report on the adaptation of the soil and climate to the production of cotton;—I have the honor to report that since my residence at the station of Goruckpore and during the winter of 1843, I travelled over a large portion of the district, South and N. W. of this Station. The Eastern portion of the District I had never visited, I therefore proceeded on a tour in that direction, through the country near and contiguous to the great Gunduck river. During the whole of my route I met with no fields of cotton; some few plants I saw growing in the Urrur *khets* and immediately round the cabins of the ryotts. Throughout the whole of this district the cultivation of cotton is very limited. In the Eastern portion where it is planted as a crop, the cultivation is not sufficient to supply the wants of the population. In different places, the same cotton is frequently called by a different name. The plant known here, however, is classed under three heads generally, the Kooklee, the Bogalee and Nurma. The first named is mostly cultivated; it is planted in February and gathered in June and July following. It is an inferior description of Nankin cotton, it however makes a strong coarse cloth, and is a prolific plant, and yields, as I was informed, from three to seven maunds (of 80 pounds) of *cupas* per béga of 3136 square yards. I very much doubt the correctness of this information, for if such a produce can be got (it would be a paying crop to the cultivator,) I cannot imagine why it should not be more extensively cultivated. Any surplus over the ryotts' wants would find a ready market in the neighbouring bazars. I could learn of no objection to its cultivation by the natives, but this, that it required more labour to grow and gather it than other crops.

2. The Bogalee and Nurma are very little cultivated. The first is planted with *Muckha* and *Urrur*, at the commencement of the rains; the Nurma is planted round the huts; both produce in February and March, and give but a small return. In almost any portion of the district a plant of cotton may be met with, but nothing like a cultivation except in the Eastern portion.

3. There is but little variation of climate so far as regards heat, cold and rain; some portions are more sickly owing to their situation. For the two years I have been here, I have experienced but little if any hot winds. The monsoon usually sets in about the 15th of June, and continues until the end of September, after which there are heavy dews throughout the cold weather. In so large a district there is of course a variety of soils, which are classed under five heads—the Muttea, a rich dark soil; the Ballooa, or sandy soil; the Dorus, a mixture of muttea and bullooa; the Bhat, clay and sand with chalk; and the Bauger, yellow clay and sand. The bhat though it is not so rich a soil retains its

moisture throughout the year, and is the land on which the cotton to the Eastward is usually planted. This kind of land from the fact of its retaining the moisture, is I think to be preferred for cotton cultivation; and for the trial of an experiment, I would give the country near the Gunduck, where this land prevails, the preference. The objection to the other qualities of land is the dryness of their soils, and they do not retain a sufficiency of moisture but for a short time after the rains have ceased. There are other portions of the district where the cotton plant would thrive well, particularly on the new lands of the grants, where as yet the soils contain a quantity of vegetable manure, but there would be great difficulty in procuring a sufficiency of labor to try an experiment to any extent on the grants. To the Eastward, near the Gunduck, where the native cotton is cultivated, the country is not deficient in population; and the experiments might be carried on there to any extent desired.

On the jungle grant of Mr. McComish near this Station, I planted about five begahs in American and native cotton. The native is not very good, but the American is without doubt the best I have seen since I have been in the country. The plants are weighed down with the fruit, and the pods are quite as large as they attain in the United States. If I can secure this field from theft, I think it will yield three or four hundred pounds of *cupas* per acre.

4. From the result of this season's cultivation, it would appear, that the failure of the experiment is not owing to the unfitness of climate and soil, but to the ravages of insects, and this I think proved from the fact that since the cool weather has set in and chilled out the worms and insects, the plants have reproduced, and are now yielding some cotton.

5. From these remarks, I do not mean it to be inferred that another trial here would meet with success. There is no difficulty in growing the plants, but there is no security of gathering a crop of cotton from them, unless the worms and bugs could be got rid of; the production of the plants this season is owing to the mildness of the weather which.

has been just cold enough to destroy the worms, without injuring the plants.

I have, &c.
(Signed) S. M. BLOUNT,
Government Cotton Planter.

Office of the Govt. Cotton Plantation,
Goruckhpoor, the 18*th Jany.* 1845.

On the Chinese methods of Tile and Brick-making, of burning shells for Lime, of expressing Oils, &c. Communicated by A. GRANT, ESQ., *Bengal Medical Service.*

To J. HUME, ESQ., *Hon. Secretary, Agri-Horticultural Society.*

DEAR SIR,—I beg to forward for the Agricultural Society some specimens of Chinese seeds and manures, of which I enclose a list. I send also, as promised in my last note to you, the drawings with letter-press descriptive of the Chinese methods of tile and brick-making, of burning shells for lime, and of expressing oils, to which I have added a sketch of their ordinary cooking range. I am very desirous to have these attached, if possible, to the " Diary of Chinese Husbandry," as I believe the whole together would convey a tolerably correct idea of the economy of a Chinese farm.

Yours, &c.
ALEXANDER GRANT,
Bengal Medical Service.

Calcutta, 7th January, 1845.

Memorandum.

1. The seeds of the Medick or Trefoil.
2. Ditto in the compost in which they are sown.
3. The wood-ash which is applied to the leaf of the Trefoil.
4. Ashes of the various grasses taken fresh from the furnace.
5. The composition of earth and ash, in which the seeds of most grains are sown, particularly in hard clay soils.

6. Oil cake, the refuse of the expressed seeds of the vegetable tallow tree, (Stillingia sebifera.)

P.S.—The manures are those requested in the queries by Dr. Playfair.

7. A species of millet.
8. A species of bean.
9. Oil and varnish nuts.
10. A species of bean.
11. Sweet potatoe cut up and dried, it keeps long, and would be valuable to seamen on long voyages ; it is dried in the sun.

Tile and Brick-making.

The bricks made in China are of a blue color, very hard, and when struck they elicit a sharp metallic sound. The clay is principally procured during the digging of Canals, it composes the deep soil of the vallies, and is the long accumulation of decomposed trap that has been washed down from the sides of the hills. When it is intended to cut out a new line of Canal, there is raised in the immediate neighbourhood a large temporary shed made of bamboo, and thatched with loose paddy straw, this forms the tile and brick manufactory; close to this again is the burning kiln, and between both is an open space for temporary drying in the sun. The expense of the whole is very inconsiderable, and a man of the most moderate ingenuity could make for himself the whole of the tile apparatus, during the leisure hours of a day.

EXPLANATION OF THE PLATES.

Plate I.

Figs. I and II.—Represent the instruments for severing the clay ; *a.* is a coarse framework, and *b.* a strong brass wire stretched between the extremities *c. d.*

Fig. III.—Is the mass of clay finely prepared, and shaped into proper form, *b.* is a wooden support for the mass. It is sliced horizontally from the upper surface by the small machine represented in figure IV.

Fig. IV.—*a.* is the handle, *b.* the frame, *c.* the wire, and the space between *c.* and *d.* is the thickness of the tile.

Fig. V.—Is the mould upon which the slice of clay is laid, this mould is covered by coarse muslin to prevent the clay from adhering, five tiles are made at once, the mould is placed on the summit of figure VI. which is a block of wood revolving on a pivot; a slight circular motion is given to this, and the labourer applying a little water to the surface of the clay, smooths it by the concave piece of wood represented by figure VIII. He then determines the length of the tile, which is done by the simple bamboo instrument represented at figure VII. The mould is then carried to the temporary drying ground, it is separated from the clay by passing one of the two handles marked *b.* within the other, the muslin bag is next removed, and there is then left a hollow cylinder of clay rather narrow at the top, and which when partially dried and being gently struck separates into fine tiles. The whole is the work of a few moments.

Plate II.

This plate represents four different kinds of moulds for bricks.

Fig. I.—Represents the mould of a form of brick very much used in running up partitions, it is hollow on one side, and into this hollow a piece of split bamboo is laid by which means each row of bricks is joined, and greater firmness given to the whole.

Fig. IV.—Is a mould by which two thin bricks are made at once by division with a wire at the sulcus *a.* ——.

Specimens of these moulds could be easily procured at a very trifling cost.

Lime-making.

The lime is procured at all the parts of the east coast of China, which I have visited, by burning the shells of the genus *Ostrea*, which abound on the neighbouring shores. It is too valuable to be much used in agriculture, but the Chinese are not ignorant of its uses.

Plate III.

Fig. I.—Represents the front of the kiln: *c.* is a plain brick wall with an open hearth in front, against which a pile of shells is heaped; *a.* is a hollow space, filled with charcoal; *b.* is the communication with the blowing apparatus, through which active ignition is kept up.

Fig. II.—Is a back view, and represents the air-bellows: *a.* is the handle; *b. b.* is a large door hung from a cross beam, and moving in the sides *d. d.* which are coated with clay, and kept moist; this simple

Tile and Brick making

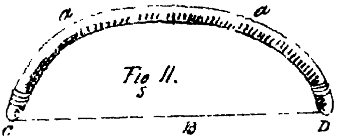


Fig II.

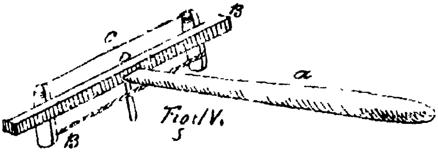


Fig IV.

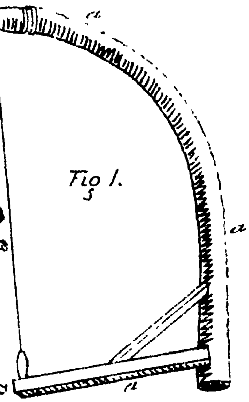


Fig I.

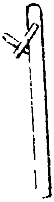


Fig VII.

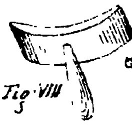


Fig VIII

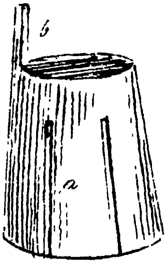


Fig V.

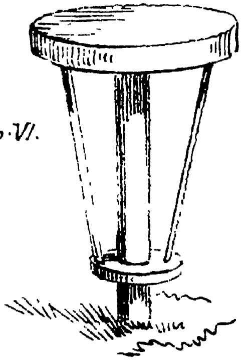


Fig VI.

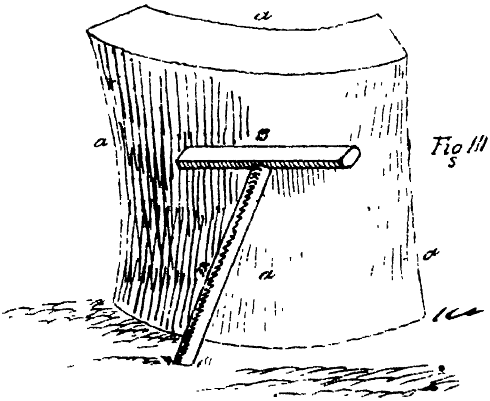


Fig III

Plate. II.

Tile and Brick making

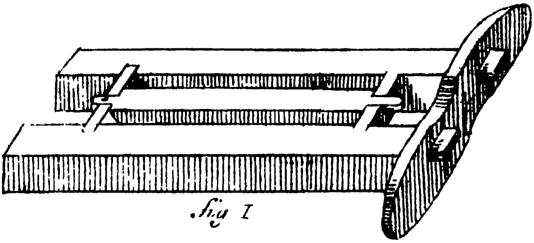


Fig I

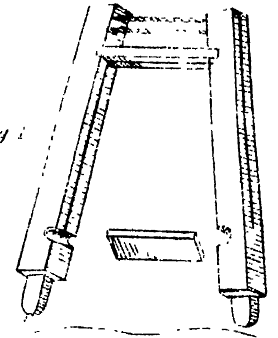


Fig 2

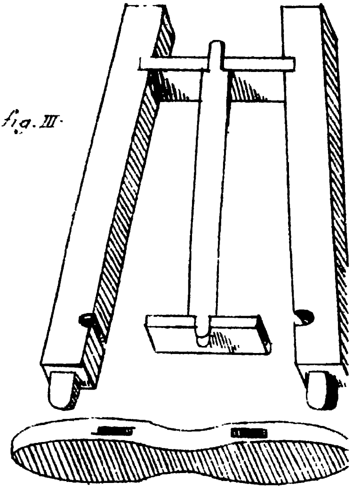


Fig. III

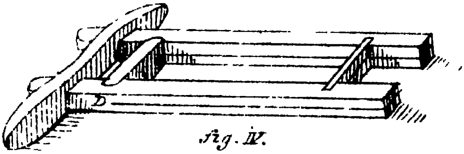


Fig. IV.

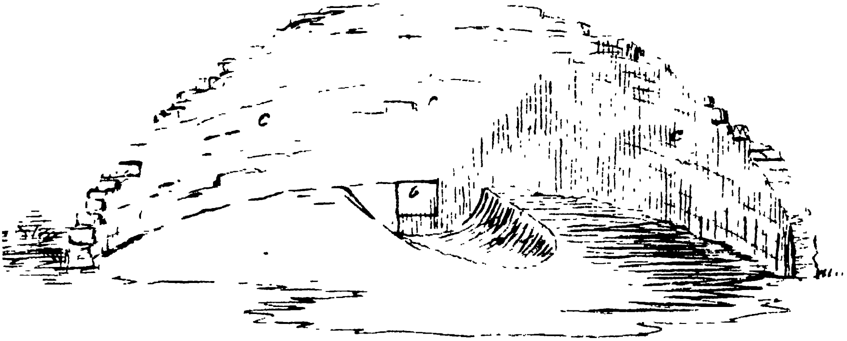
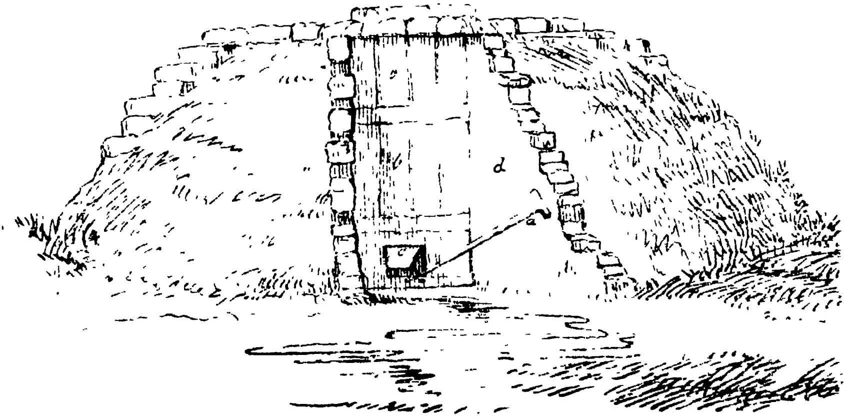
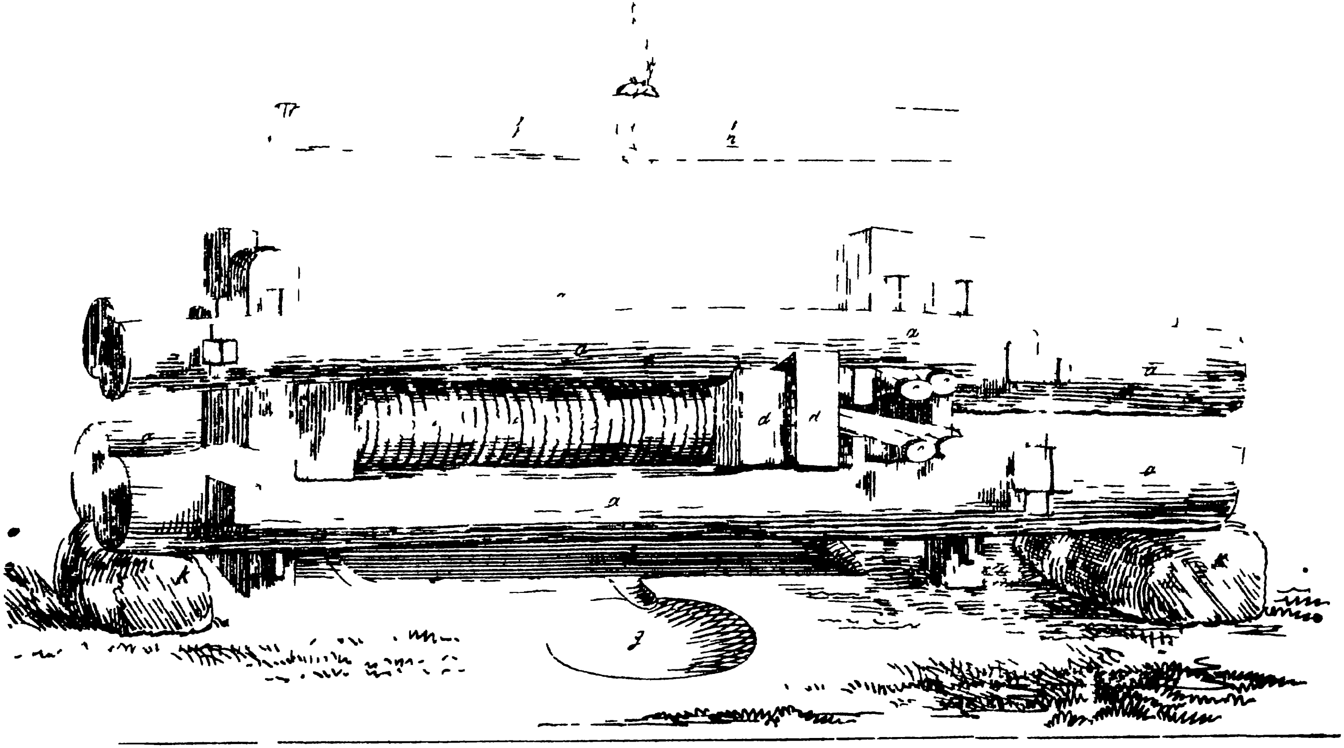
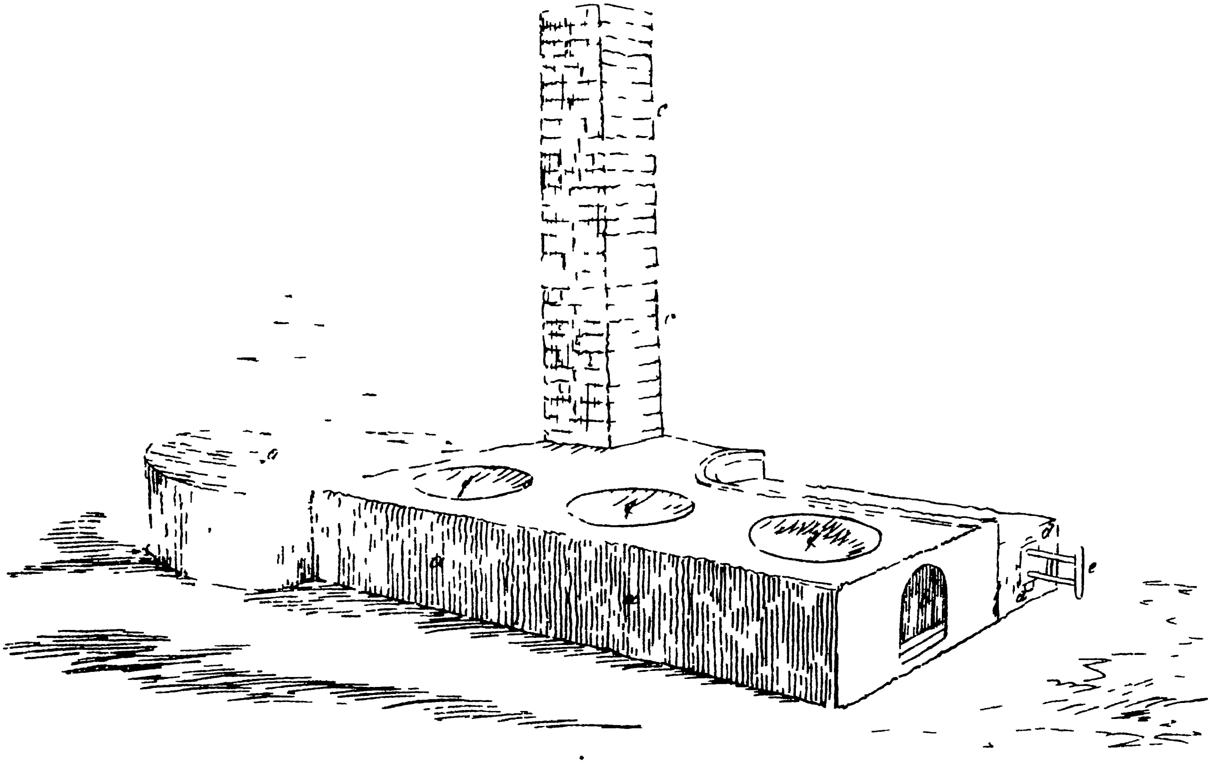


Fig 2





a
a
a
a
a
d
d
h
f
k
k
g


c
a
d
e

measure makes the suction complete: *c.* is the valve in the door. It is worked by one man, it costs but very little, is effective, and not liable to get out of order.

Oil Press.

Plate IV.—This plate represents an oil press in full working order. It is used chiefly for expressing the oil from the seeds of the tallow tree (the Stillingia sebifera). It is rude, but effective, and is worked by three or four men.

Explanation.

a. a. are four logs of wood, the two lower of which rest on blocks of granite *k. k.*, and the whole are firmly knit together by the four perpendicular posts *b. b.; c. c.* are four large wedges shod with iron; *d. d.* two blocks, which move in the channel between the cross beams; *e. e. e.* are a series of round hoops made of twisted bamboo, and which when joined together, form a long cylinder; into this cylinder the seeds (previously cleared of their outer or white waxy part) are placed by bundles bound in common straw: the work then commences. Three coolies seize hold of the heavy beam *h. h.*, which hangs from the roof by the ropes *i. i.*, and running a few steps backwards they then advance and strike with a sharp and strong impulse some one of the wedges at *c. c.* As these are driven in, the blocks *d. d.* advance, and press the cylinder *e. e.*; by which means the seeds are subjected to a powerful compression, the oil oozes out from between the interstices of the hoops, and dropping in the stone gutter *f.*, is finally collected in the trough *g.*

A Cooking range.

Plate V.—*a. a.* is a brick wall enclosing the fire-place, which extends throughout its whole length; *f.* is the mouth of the fire range; *c. c.* is the chimney; *d. d.* is a box bellows, of which *e.* is the handle; the attendant blows the bellows (which is a fixture) with the one hand, while he feeds the fire with the other; *f. f. f.* are three flat iron pans, which are all that are necessary for every variety of Chinese culinary operations. They cook a good deal by steam; a grating is placed over one of these pans filled with water; on this grating perhaps a dozen dishes of vegetables are placed; a deep cover surmounts the whole, and confines the steam.

Their firewood consists almost entirely of brushwood or straw, and this range is admirably adapted for consuming such materials without much loss of heat.

Communication from MR. SOUTHEY, *on the improvement of the breed of Sheep in India.*

(Presented by the Bengal Chamber of Commerce.)

J. HUME, ESQ. *Secretary Agricultural and Horticultural Society.*

DEAR SIR,—I am desired by the Chamber of Commerce to transfer to you the accompanying communication, received from Mr. Southey, on the subject of improving the breed of sheep in India, so as to obtain a superior quality of wool, whose export may be alike beneficial to India and to the manufacturers of England.

The Committee of the Agricultural Society, the Chamber deems to be the most competent to appreciate the merits of Mr. Southey's suggestions; and to take steps, if approved, to have the proposition tested by a series of experiments in this climate. I have, &c.

W. LIMOND,
Secretary.

Calcutta Bengal Chamber of Commerce, January 9th 1845.

WILLIAM LIMOND, ESQ. *Acting Secretary to the Bengal Chamber of Commerce, Calcutta.*

SIR,—Having on more than one occasion been requested by the Honorable the East India Company, and also by the East India and China Association, to offer an opinion on sundry samples of Indian sheep's wool, which they have at various times received from India, and to suggest such means as I conceive likely to improve the breed of Indian flocks and qualities of their fleeces, I take leave, at the recommendation of Mr. Stikeman, to forward you the accompanying samples, the produce of cross breeds betwixt a Bengal ewe and an English Merino ram, the property of the Right Honorable Lord Western, from which may be seen the advantage likely to accrue to Indian flock-masters by due attention being paid to the cultivation of the breed of sheep in our Indian territories and dependencies, and I humbly conceive that with increased attention, wool may become a source of wealth to our Indian possessions, at the same time prove an article of incalculable benefit to the manufacturers in the British nation.

Being personally acquainted with many gentlemen who have long resided in India, I have heard what appears to them impediments in carrying my views into effect; to which I reply, "Make it an object to the owner of sheep to accomplish the desired end, and you must succeed."

Col. Jervis has already demonstrated, that with due care a superior race of sheep may be reared, producing wool infinitely more valuable than the native stock; and I flatter myself the time is not distant when the wool of India will be so much improved in quality as to be classed in our wool reports amongst those of our other wool-growing colonies.

I remain, &c.

London, 30*th Oct*. 1844. THOS. SOUTHEY.

P.S. You will be pleased to lay before your Chamber of Commerce the accompanying samples, and give as much publicity to the subject as you may deem proper.

To the Honorable Court of Directors of the East India Company.

HON. SIRS,—In presenting to your Honorable Court the cost and expenses attending the purchase of 12 Merino sheep from the flock of the Right Honorable Lord Western, which were bought by directions of your Honorable Court, I cannot refrain from offering the following observations on the wool of a Bengal ewe, which were shown me by his Lordship whilst on his domain, together with her progeny to the second.

generation; and his Lordship having kindly presented me with a fleece of each year's produce, I have much pleasure in presenting to your Honorable Court specimens of the three years' growth, which I presume will clearly illustrate, that by ordinary attention, the present breeds of Indian ewes may be converted into wool-bearing animals, producing wool that would realize double its present value.

No. 1. Native Indian Ewe.
,, 2. First cross, with a Merino Ram.
,, 3. Second cross, with a Ewe of the above.
,, 4. Sample of Merino Rams, wool shipped to Madras per "Lady Flora."

It affords me great gratification in thus demonstrating to your Honorable Court, a theory which I have long entertained, that the flocks in your Honorable Court's territories in India and your dependencies, is capable (with ordinary attention) of producing wool, both as to quality and quantity, that would become an article of vast importance, both to the flock owner in India, and the British empire.

I have, &c.
THOS. SOUTHEY.

Coleman Street, 31*st Oct*. 1844.

THE JOURNAL

OF THE

Agricultural & Horticultural Society

OF

INDIA.

Observations on the quality, &c. of the principal Timber trees growing in the vicinity of Jeypore, in Upper Assam. By Capt. S. F. HANNAY, *(40th Regt. N. I.) Commandant of the Assam Light Infantry Battalion.*

(Communicated by Major Francis Jenkins, Commissioner of Assam.)

MY DEAR JENKINS,—The clearing of the jungle in and around the station of Jeypore having enabled me to make a collection of samples of the different timber trees, I have the pleasure to send a list of 38 sorts collected here, and through the agency of Mr. Bonsall, of the Assam Company, from Hookungooree, with a few I had before collected at a former period. Most of the trees in the list will be found to correspond with those published in Mr. Masters' Catalogue of timber trees of Upper Assam,* and as they comprise all, I believe, of what may be called "forest timber trees" growing on the plains and in the Hills, it may be considered of importance, with reference to the future timber trade of Assam, that the different samples and list should find a place in the rooms of the Agricultural and Horticultural Society, for the inspection of the timber merchant. I wish that I could have made a better selection of samples, but this is not so easy a matter, in the absence of workmen. I shall however try and make up for this by my own opinion, formed from experience as to the qualities of some of the kinds, the general opinion of the country as to the uses and properties of all, together with a few observations on the localities of different forests, and the practicability of obtaining the best kinds for exportation.

---

* This Catalogue will be found in Vol. III. page 6.—EDS.

No. 1.—Nahor or Nagesur, an exceedingly hard and durable timber whether it be heart-wood alone, or accompanied by more or less of young wood. There are two kinds however, the Dareeka Nahor and Bor Nahor, the former containing most heart-wood, and is deepest colored. The grain of both kinds is sometimes prettily veined, and some few specimens of the sort I have seen, were exceedingly beautiful. The Nahor is highly prized for posts of houses, as they last for years; the outer wood however, particularly of young trees, is liable to decay, if not in the first instance seasoned; however, it is necessary to mention here, with regard to the Nahor, as well as all other woods employed in building or for any purpose in Assam, that little attention is given to seasoning, or even as to the proper season and time for cutting timber trees; and consequently, many timbers which, with proper precaution taken in this respect, would prove valuable and lasting, are subject to premature decay and the attack of insects. The white ants cannot touch the heart of the Nahor, after it has become thoroughly seasoned, and it is employed by the natives in every thing requiring strength and durability as well as elasticity, which last quality I think debars its use for beams, upon which any considerable dead weight of masonry is to lie; but this probably requires to be tried. The Mishmies of the Brama-koond make their spear-shafts of it; I should say however, that they use very young trees for the purpose, from the paleness of the color, but nothing can exceed the beauty of its polish merely from hard rubbing, and in this state, I have often said that it was exceedingly like the lance wood of America.

The Nahor is a very handsome tree, growing to an immense size in some parts of this neighbourhood; its flowers are very pretty, with a most pleasant fragrance, and its delicately colored young leaves are worn in bunches to adorn the hair, and stuck through the ear-lobes of both sexes of the frontier people. From the seeds, when ripe in October, nearly fifty per cent. of oil can be expressed, which however, although possessing medicinal properties equal to *Petroleum*, in diseases of the skin, besides being a good lamp oil, as usual, our inert population never think of using. From the tree, making incisions in the bark, a fragrant balsam exudes, which alone, or diluted with oil of turpentine, makes a very good wood varnish.

The Nahor is common I believe in some parts of Lower Assam, but not so much so as in Upper Assam, where it seems to thrive best on the red clays of the secondary formations. On the Dhunsiree in the direction of Dheimapore, there is a Nahor Forest; there is a Nahor Forest also near Dibrooghur,(1) but I have never seen this tree, of the size equal to what it is in the lower range of Naga Hills, south and south-east of this place, particularly on the spur which separates the Taorak and Dillee rivers; here, and also on the hills between Jeypore and Hookungoori, although it cannot vie either in height or girth with the splendid Hoolung, Mekai or Tehaum, it is nevertheless a fine and noble tree, its gnarled and knotty stem seeming to bid defiance to the axe; indeed it is evident that when such an obstinate denizen of the forest lay on the line of road first opened by the Assam Tea Company to Hookungoori, it was found the easiest mode of cutting these down to use the cross-cut saw.

---

(1) There is an extensive wood of Nahor trees near Dibrooghur, as mentioned by Captain Hannay, but I doubt its being a natural forest; I conceive that all the ground now occupied by this forest was not long ago village land (Barris), and that the Nahor trees have propagated themselves to the extent we now find them, from the seeds of the trees which had been planted in the villages or along the sides of the road to form avenues. I do not recollect to have seen the Nahor tree in any genuine forest (Habbi, of the Assamese) but I think wherever I have met this most ornamental tree it has always been on land that could be traced to be deserted villages. —F. J.

No. 2.—The *Jutelee* is a heavy, hard, and probably durable timber, but from its scarceness on the plains,(1) I am not able to ascertain its qualities; it has the name however of being equal to the Nahor for strength and durability.

This tree grows to an immense size; there is one visible about ¾ of a mile from the lines at Jeypore, which overtops the whole neighbouring forest; a plank from 3½ to 4 feet wide might be cut out from the lower stem; from the seeds a beautifully clear and fragrant resin exudes in drops from fractures; and from knots also, there is a collection of softest resin, which burns freely, and emits a strong odour of Gum-Benjamin.

I have seen the Jutelee of considerable size on the plains in Muttock, but solitary trees only. In this neighbourhood it is associated with the Nahor and other trees, and may be considered as a forest tree.

No. 3. *Mekai*.(2)—Although unable to speak to the qualities of this as a suitable timber tree, under proper management as to time of felling and seasoning, I have reason to believe it would prove a very valuable timber.

The Mekai grows to an enormous size both in girth and height, and has a beautifully smooth stem, quite free from knots; there are two kinds, one of which furnishes a gum resin in great quantities; spontaneously oozing out from under its scaly bark, particularly during the hot days in May, when it may be seen hanging in icicles several yards long, and frequently as clear as crystal; the Nagas who bring it sometimes for sale, tap the tree, and I have seen it in tears of a clear amber color, of about a pound weight. It is not an uncommon thing to see some of these Nagas wearing a piece of this gum resin through the lobe of their ear as an ornament; specimens of this gum have been sent to Calcutta, but I have never heard the opinion given of it. It is not *Gum Copal* nor can it be "*Gum Anemi*," as it does not possess sufficient toughness to form a good and lasting varnish with linseed or turpentine. It seems to contain in itself a volatile oil which causes it to be easily affected by the heat of the sun; if this was evaporated or distilled off, probably the residue would be better adapted for a varnish by itself, or united with other gums.

---

(1) The Jutelee is very abundant on the plains in Muttock, and not in single trees but extensive groups; it is one of the most ornamental trees I know, the trees being lofty, generally growing in 3 or 4 stems from one root, and branching out close to the ground, and the foliage is light and handsome, something like the poplar.—F. J.

(2) The Assamese do not extract from this Dipterocarpus, an oil, as is done on the coast of Arracan and Chittagong: and it may be neither of the species which there produce wood oil. Mr. Masters, it will be observed, does not determine the species.—F. J.

No. 4. "*Hoolung*."(1)—I am unable to speak as to the qualities of this tree, as a timber, but small trees have been lately used in bungalows as beams, and they seem to season and answer very well, and the insects have not attacked them. I am told by the *Dhoanneas* that excellent canoes are made from the Hoolung; they last well, but are rather heavy. From the name of the tree, Hoolung, and Hoilung or Harlung, a large canoe, a Shan word, it is possible that the name is derived from the circumstance of the Ahoms having used this timber in forming the war canoe of former days.

The Hoolung even surpasses the Mekai in size, and is perhaps one of the largest timber trees in nature; it is associated with the latter, and forms with it, immense and splendid forests rarely to be surpassed for size of timber. Whether the Hoolung is the wood oil tree of Burmah and the Arracan coast, I cannot say, but by tapping the stem, quantities

(1) Holong of Mr. Masters.—F. J.

of a fragrant balsam of the consistence of ghee, and having all the qualities of the wood oil, is obtained.

No. 5. *Tehaum.*(1)—This is a fine timber tree, both as regards the quality of its timber and size as a forest tree, the dimensions often equalling in girth and length the Mekai and Hoolung, with which trees it is associated in the forests of the lower Naga ranges of Hills.

The wood of the Tehaum is noted both in Sylhet and Assam as a timber of excellent quality, and I believe it to be so : I have seen a table of great beauty made of the Sylhet variety, which appeared very like the Mirabow(2) wood of the Straits of Malacca. In Assam (i. e. Upper Assam) there are two kinds, one the "Kon'thal Tehaum," the fruit of which the natives eat; large trees when procurable at convenient distance from a river, are particularly prized for Hoolungs(3) and Khel boats;(4) for boats this wood is considered of first quality.

No. 6. "*Joba Hingooree.*"(5)—This is a species of oak, which growing only on the Hills, is only used by such of the natives who have the tree growing near them. The specimen sent is not a good one, being from a small tree; the timber of old and larger trees being darker colored and veined more like the oak. Amongst the Singphos, it is preferred on account of its hardness for implements of husbandry.

The above species of oak is associated with the Bor Hingooree and Kanta Hingooree, Nos. 7 and 8, in the ranges of

---

(1) Sam of Mr. Masters.—F. J.

(2) See page 81 of this volume, (department of "Correspondence and Selections,") for a list of the timber trees of Malacca, wherein it is stated that the "Marbouw," resists the attacks of white ants for one hundred years and upwards.—Eds.

(3) Large cargo canoes used by the merchants.—F. J.

(4) Light pleasure boats, sawarree boats.—F. J.

(5) Hingooree or Singooree, is the provincial name of all the oaks and chestnuts; of these genera we have 20 or 30 kinds in the valley of the Berhampooter and its adjacent hills.—F. J.

Hills, but the last named are also found in the plains at the foot of the Hills.

The timber of the last named would, I think, under proper management, prove a very serviceable timber: both, when green, split very readily, and good rough hewn planks are very easily formed, in which state it would season well, and would be the best form probably to raft it for exportation.

The only thing of note regarding these last, as regards use, is that the Rajahs of Assam appeared to have been alone permitted the use of the Hingooree in building; the palace of the kings being designated *Hingooree Ghur.* The natives eat the seeds of these castaneas, or species of chesnut.

No. 9. "*Sopa.*"—Of this tree there seems to be no less than five varieties, of which however I can only distinguish three(1) in the samples now sent, Nos. 9, 10, and 12.

Teeta Sopa and Kureeka Sopa, appear to me to be a very superior description of timber, and are noted amongst the natives for their durability, lightness, and strength; the former is much prized for boats. They are not so common here, as a forest tree, as the Mekai, Nahore, and Hoolung, but I have reason to believe they are more so in the forests on the north bank of the Burumpooter. The "*Tita Sopa*" is a common drift timber of the Burumpooter, and some boats of this wood of a large description, are yearly brought by the boat cutters of the Dihong river. In October 1844, I saw on the sands of the Burumpooter, a stem of the Tita Sopa of hard, well seasoned heart timber, 30 feet long and about 4 feet in diameter. It grows in the plains, also in this neighbourhood, and of sufficient size to prove useful. The Foolsopa is a light fragrant wood, but does not appear to stand exposure to the weather like the Tita Sopa, the bark of which is astringent, and eaten by the natives with Pawn; the sweet smelling flowers of the Foolsopa are well known.

---

(1) The list gives 4, I presume they are all (Champas) Michelias. Mr. Masters has three in his list.—F. J.

No. 13, Heleekha.[1]—This is a strong and durable timber, esteemed for house posts, not being liable to decay. The fruit of this tree is astringent, and is eaten by the natives. Hindoostanees say the fruit is the same with the Hurr (?) a common medicinal berry, sold in the bazars of India.

The Heleekha is a common tree both in the plains and hills in this neighbourhood, and grows to a considerable size; it appears to me a wood deserving of attention, being very prettily veined.

Nos. 14 and 15, Bor Bola and Heela Bola.—This is a timber much prized by the Assamese, and deservedly so, for I think there are few (if any woods) excepting the teak, which surpass it for lightness, strength and durability in all situations, and it possesses some beauty also. There are three kinds of Bola, two of which only (those now sent) assimilate, the other the Noonee, or mulberry-leafed Bola, I have not been able to procure; but although of a deep yellow color and close transparent grain, it is not so much prized as the other two. Both are used when procurable as house posts, the former being the lightest is universally used to form the Buetas, or long paddles of the fishermen, and other boatmen of the province. These Buetas are either formed by splitting young trees, or cutting off pieces of sufficient size from the largest trees, the tree when fresh being easily split; each Bueta or paddle costs from 4 to 8 annas according to size, in the rough; they are finished off by the boatmen themselves, and it is astonishing to see how delicately slender they are made and yet what strain they will bear, in forcing canoes up very strong water. The wood has the quality of standing the weather well, and constantly in water, seems to harden, and get black colored; it appears to me to be admirably adapted for oars and ships' spars, and probably for building boats, if well seasoned.

Numbers of the Bola timber trees are drifted down the Burumpooter from forests of the lower Hills, bounding the

(1) Hilikha of Mr. Masters.—F. J.

valley, and when left on the sands, they are soon cut up by the dooms, or fishermen; in this way many a splendid timber is hacked and destroyed.

The Bola of a considerable size is common in the forests of the plains, particularly in Muttoçk.

Nos. 16, 17 and 18,—comprise three out of four species of the Toon, which are common in Assam. The Hindooree Poma is prized most, as though light, when once seasoned, it is very durable, and some splendid boats are formed of it; particularly in the Dihong River, where it would seem to be in great abundance.

The Poma is common also in the plains as well as in the hills of the Upper Assam valley on both sides of the Burampooter; the fourth variety, of which I have not been able to procure a specimen, is called Gendala Poma, and has a fragrant cedar-like smell. Fine timbers of the Hindooree and Gendala Poma are annually drifted down the Burampooter, and very splendid trees of the first named grow in this neighbourhood; trees of smaller description are also common in the forests of the plains.

Nos. 19, 20, 21, 22.—Of these four varieties the Sissoo ranks first, and probably the Moj the next. The qualities of the Sissoo are well known, and I believe the heart-wood of the Moj is nearly equal to it in durability; of the *Koroi*(1) perhaps it may be said that the outer wood is useless, but the heart-wood stands very well in water; the Medala looks a serviceable wood; and another of the Acacia kind which is common in some parts of Assam but not here, produces a very hard and pretty heart-wood, and is called by the Singphos *Gy-yoon*, and the Assamese *Soa*.

The Sissoo begins to appear on the *churs* of the Burampooter about Dihoroo mookh, and continues to be found from

(1) The "*Koroi*," is perhaps the Koirah of Lower Assam, which I believe is Roxb. Mimosa Catechu. Beng. Khira, Vol. II. p. 563. The wood of the large trees is of a very handsome red colour, and makes most permanent posts; the tree is abundant, but seldom allowed to grow to a large size.—F. J.

that point to Suddiah and above that place, particularly in the vicinity of the Nao Dehing mookh; and as high up as Choonpoorah, many trees of considerable size have been cut, and probably more exist than can be seen from the bed of the river, those only being taken which were most easily got at. The Moj, Koroi and Medala are common in every tract of forest we have, the Soa is a very common and fine tree in many places, but I have never seen it as a forest tree; but on the upper Noa Dehing near Man Mo, Dhun or old Beesa, a tolerably transparent gum exudes in quantity from this last on making incisions on the bark.

Nos. 23, 24, and 25.—Are three or four species of the Jamoon (besides the Goolaub Jamoon, or rose apple) which are very common, particularly in this section of Assam; the most common tree in the plains of this neighbourhood being the Boga Jam, distinguished by its peculiarly smooth and white bark; these are all noted for their strength and durability; the Boga Jamoon grows very straight and tall, and is thus well adapted for posts and beams; the Panee Jam, the fourth variety, (not sent,) is a stunted tree growing in low ground, of great hardness and strength like the others. The Bor Jamoon which seems to correspond with that of Bengal, is the only one of the varieties sent, the fruit of which the natives eat. The rose apple, strange to say, grows wild in the jungles. The whole of the varieties are noted for the astringent qualities of their bark.

No. 26.—This is a timber little thought of by the Assamese; but being a species of teak, and possessing great qualities as to durability, and not being liable to decay even when put in a green state into the ground, I think it highly deserving of notice. The sample sent is not so good as might have been procured, but I had no means of procuring better; as a proof of its durability I may mention, that a bridge at Tengri erected of this timber several years ago, is still standing, as sound I believe as ever. The *Ghorah,* I am told, grows on the hills to a great size, and is used by the Singphos and other frontier people as house posts in preference to all other timber. It is a very common tree in the jungle, on the banks of the Burampooter, as well as every other tributary stream in the Jorehauth and Muttock districts, and is often of a very considerable size. It is distinguished by its whitish bark, and very often gnarled and twisted stem, of no great height, being a very branchy tree, these last formed as if they had been intended for the crooks and knees of boats. This wood contracts and strengthens much by seasoning.

No. 27. *Huluck.*—This is a timber tree not mentioned by Mr. Masters (neither is the last named) ; the Huluck however is one of the finest forest trees we have, and is a timber much esteemed by the natives of Upper Assam, and probably two-thirds of the canoes of Upper Assam are formed from it, arising probably from the fact of the Huluck being found plentifully distributed in accessible localities on the banks of rivers and hill streams.

It is very common in the forests of Muttock, on the banks of the Tingri at Kato barree, on the banks of the Dehing and Namsang in the southern Hills, and also on the banks of the Dehong river, and next to the Mekai and Hoolung is the most plentifully distributed tree we have.

It is distinguished by its fawn-colored bark, tall stem, and light green leaf, the branchy top of the tree spreading to a great extent. The Huluck seems to occupy the flats in the different beds of the hill streams, and is thus more accessible to the boat cutters.

No. 28.—A species of Willow,(1) common in the Soonderbunds. I have seen no wood better adapted for weather-boarding or beams, and other timbers for thatched roofs.

The Bhé grows in low grounds in Upper Assam near the beds of rivers, and on the edge of *Pathers*(2) and

---

(1) This willow is met with in Lower Assam, but is not common.—F. J.

(2) Rice plains.—F. J.

Jeels; it attains a considerable size in the jungles about Jackerah.

No. 29.—This is a timber tree which is noted as strong and durable, and well adapted for boats; it is common in the plains about this station, and some trees of a magnificent size are to be seen in the Tipam Tea Baree.

No. 30.—A tree found in Upper Assam, and is associated here with the *Amrah* and Am Seia, a black varnish tree, all of the same species.(1)

No. 31.—This is a timber well known at Dacca, and is admirably adapted for that portion of boats under the water; well seasoned it is a good wood, and considered equal to the Tehaum, and for boats probably better. There are two kinds, one of a small growth, which is to be found on the banks of ditches.

The *Jarool* is very common, and is associated with the *Gorah* or Assam teak, on the banks of the Dekho and Disang rivers in the vicinity of the Burampooter; the flowers of this tree in the month of June are very beautiful.

No. 32.—This is merely given as a sample of a very close-grained, white, light wood, common in Upper Assam, being a very pretty tree with bunches of white flowers. The seeds when ripe are worn by the natives, and called Bamruttee, and is probably a Monocera. The leaves of this tree are used as a fast dye of a yellow colour to cotton, before using Munjeet.

No. 33.—An exceedingly hard and durable timber, and I believe the whole of this genus are so; the heart-wood is nearly as hard as Lignum Vitæ. The tree is common in all our Upper Assam jungles.

No. 34.—There are several kinds of this tree, which, although a short grained, brittle wood, stands well when cut at a proper time and seasoned. There are trees in this neighbourhood which have been cut for some years, and have been exposed to all weathers, yet are perfectly sound; this timber is well adapted for chockals, or for any work in chopper roofed houses.

---

(1) *Order*: but this is incorrect, the Spondias (Amrah) being of a very distinct order.—F. J.

From this tree a clear red colored gum exudes like kino, and from the bark by boiling with water, an astringent and sweetish extract is obtained which hardens; the natives also employ the leaf with iron in dyeing a black color. The berries or fruit are very glutinous, and answer to a certain extent the same purpose as *gab*. The charcoal of the Uriam is esteemed by blacksmiths.

The Uriam is common in all our jungles in the plains of Upper Assam.

No. 35.—This is called by the natives Amaree, and often Amaree Poma, and is decidedly, from the similarity of the leaf, bark and fruit, a species of toon; it appears to me to be equal to many of the Mahoganies we see in common furniture; it is considered in Assam a strong durable timber; there are two kinds, the red and the white. Very fine trees of this timber are to be found in the neighbouring hills, and some no doubt beautifully veined.

No. 36.(1)—There is no tree we have in Assam, which after proper seasoning appears more durable than the "Sassafras;" boats of great size formed of this timber are yearly brought down the Dihong river, and are greatly prized; some very fine timbers are found on the sands of the Burampooter, at the close of the rains, and it is probably a forest tree on the base of the northern mountains. It is a very common tree in this neighbourhood. The specimen now sent is a portion of a very fine tree, which grew within 50 yards of the parade of the Light Infantry, as well as that of the Heeluka and Medala; in fact, this spot was covered with a variety of fine

(1) From seeds of this tree Dr. O'Shaughnessy extracted an oil in all respects the same as the Sassafras oil of commerce; the oil can also be readily extracted from the roots.—F. J.

forest trees this time last year. The smell of Sassafras is very strong so long as the tree remains moist; the Assamese however do not seem to know that the wood contains an oil, which has medicinal properties.

No. 37.(1)—This is one of the gum resin trees, but of what denomination I know not. The tree was cut in the plains within the station, but it attains to a size equal to the Mekai on the hills. The shell containing the seeds when dry are hard and three-celled, and pointed at both ends about 1½ inch long, and when fresh from the tree they are covered with flesh of a green color, which has an agreeable fragrant smell, and so has the wood when newly cut. The gum resin, of a light amber color, exudes spontaneously, but by cutting the bark it comes in greater quantities and falls down to the foot of the tree, where it is collected frequently mixed with earth, according to the time which it has been thus accumulating.

The Chinese here recognise the Neribee as common in China, and say the fruit is eaten there, and that the seeds rubbed down with water are applied to sores and wounds of the skin.

No. 38.—This is given only as a sample of a tree rather common in the jungles here, and called Tez Kat, or blood tree, from the circumstance of a juice, the color of blood, exuding from the bark when cut with a *dha.*

Having now ended my account of the trees furnishing the samples now sent, I think it necessary to add, that there are perhaps as many more, some of them also useful as timber, which might be collected; but the season for collecting having passed away, you must be content with those I have sent for the present, and as far as I can recollect, samples of the most useful trees, I mean those which are best adapted for building purposes, have been forwarded. I will now conclude by stating what little I know about the probability of obtaining the best and largest timber for exportation, it is however thus far only I can offer an opinion; as to calculating the probable profits which might arise from a speculation in Assam timber, this can alone be done by the practical dealer in timber. I will only venture to say, that if good, sound, and suitable timber reached any of the wood marts of Bengal or Calcutta, it would in all probability find a ready sale; much would I dare say depend upon the description, whether in board, thick planks, beams or rough logs; and in this respect a great deal could be effected with the aid of saw-mills, near the principal forests; and for my part, as far as a wish to see the timber resources of the province went, I have ever regretted that the mill which was sent up to Jeypore by the (1)Assam Company was not put up instead of lying here rotting; a memento of bad management or incapacity somewhere: a commencement might have been made at all events, and the possibility and expence of bringing down large timbers by means of the hill streams and assistance of the hill tribes, would have been tested.

---

(1) Capt. Hannay in a subsequent note gave to this tree the name of Canarium strictum, having, he said, fully identified the tree.—F. J.

If one go back to the palmy days of Assam, when the population of the upper portion of the valley was much more dense than at present, and the Ahom dynasty of kings reigned in all the semi-barbarous pomp and pageantry peculiar to Indo-Chinese nations, war canoes and canoe fashioned boats of all kinds were common, and as the bulk of the people lived in Mué-chang houses like the Burmese, we may suppose that timber was invaluable to the country generally, and no doubt boat cutting, and cutting and rafting of timber was as well understood as it now is in Burmah. With the present generation in Assam, according to the classification of the different trades and occupations of the Ahom Khels,* we have of course the descendants of the royal boat cutters and others, whose business it was to supply timber to the state; but with the lapse and changes of years, their handicraft has disappeared, and boat cutting is now confined to a few idlers who live in the vicinity of the timber forests of the Dhunseeree, some of the Beheiahs, and Merees of the upper Burampooter, and a village or two of Abors of the Dihong, residing nearest the river and the bed of the Burampooter. The knowledge of floating and rafting has probably disappeared altogether.

---

(1) It was not put up, I understand from the Superintendent, on the part of the A. Company having reported that there was no fitting timber for Tea boxes and the other purposes of the Company, to be procured, and little of any timber whatsoever. Captain Hannay's present memoir will sufficiently show that this report was founded on bad information. Whether it was good policy in the first instance to send up a saw-mill to Jaipur may be a doubtful question, but it seems a most unfortunate economy, that after the mill was purchased and transported so far, that it should not have been put together and set to work, especially as it might have been erected within 200 yards of a mine of excellent coal, and immediately on the banks of the Booree Dehing River, which would have brought down all the timber.—F. J.

I will now conclude this rather lengthy paper with merely stating in regard to our north bank Burampooter timber localities within the Dihong and other tributary hill streams, that if a few individuals with very rude implements can bring into the Burampooter yearly from 50 to 100 boats of 50 to 150 maunds burthen, formed of valuable woods, such as toons sassafras, teham and huluck, I do not apprehend any difficulty in making a contract with these people for a supply of timber of different kinds, and I dare say they have tact enough to be able to float it down the Burampooter to the Dhunseeree, where by means of a saw-mill it could be cut up, and despatched in the form best suited for the markets of Bengal, or for transit by boat or otherwise.

On the south bank of the Burampooter, in the Jorehauth district, much could be effected, the hill streams being numerous, and the population on both the plains and hills comparatively dense; within the Dhunseeree river, indeed, I would say, a contract for timber might be very easily effected with the people of the Morung, who yearly frequent the forests to cut timber for boats.

---

* Khel, clan, of the same trade or occupation.—F. J.

The greatest difficulties appear to exist in the eastern parts of the Jorehauth district, round Jeypore and the upper Dihing, from the want of Assamese population, and the deserted state of the country in consequence of former Singpho and Burmese aggression; a great change however having taken place, and the fears of the people being almost entirely dissipated as to foreign invasion, I do not see why, with the assistance of the Nagas, who are famous tree-fellers, the magnificent timber of the lower ranges should not be brought down into the plains by means of the several hill streams falling into the Disang and Dihing rivers; money, management with the hill people, and a demand for timber would in fact overcome all difficulties of transit in the hills, where we see that noble and excellent timbers are growing on the slopes of hills of moderate ascent, at the base of which run rivers of considerable size.

I may here mention the Taorak and Dillee (the two principal branches of the Disang) the Namsang and Majador and even the Dihing itself; a little practice would soon make the Nagas perfect in this kind of work, and once in the Disang and Dihing, these timbers could be easily rafted and carried down to the Dhunseree.

Yours, &c.
S. F. HANNAY.

NOTE.—I should like to have been able to add to this paper some account of the timbers of Lower Assam, but I have not the means at present. But I may refer to Dr. Buchanan's Catalogue of Indian woods, which was published in the 48th vol. of the Transactions of the Society of Arts. Upwards of 80 of the woods enumerated in that Catalogue, were collected by Dr. Buchanan at Goalparah and in that neighbourhood, and it would be desirable, I think, if that Catalogue, corrected if possible to the present period, were republished in the Transactions of the Agricultural Society, for more general information.

The timber trade in the Goalparah Division is extensive, and chiefly consists in the export of saul timbers, from the estate of Purbutjoar on the North bank, and the Garrow range of hills on the South bank, to the great building marts in lower Bengal.—F. J.

List of Timber trees referred to in the Memoir.

No. 1.	Nahor,	Mesua ferrea.
,, 2.	Jutelee,	Lequidamber.
,, 3.	Mekai,	Dipterocarpus.
,, 4.	Hoolung,	Ditto.
,, 5.	Tehaum,	Artocarpus Chaplasha.
,, 6.	Joba Hingooree,	Quercus.
,, 7.	Kanta Hingooree,	Castanea species.
,, 8.	Bor Hingooree,	Ditto.
,, 9.	Tita Sopa,	Michelia.
,, 10.	Kureeka Sopa,	Ditto.
,, 11.	Gowreea Sopa,	Ditto.
,, 12.	Fool Sopa,	Ditto Champaca.
,, 13.	Heleeka,	Terminalia citrina, Roxb.
,, 14.	Bor Bola,	Ditto.
,, 15.	Heela Bola,	Ditto.
,, 16.	Hindooree Poma,	Cedrela Toona.
,, 17.	Ditto,	Ditto.
,, 18.	Seekha Poma,	Ditto.
,, 19.	Sisso,	Dalbergia.
,, 20.	Koroi,	Acacia.
,, 21.	Medala,	Ditto.
,, 22.	Moj,	Inga bigemina, Willd.
,, 23.	Bor Jamoon,	Syzygium.
,, 24.	Boga Jamoon,	Ditto.
,, 25.	Nohor putteah Jamoon,	Ditto.
,, 26.	Ghorah,	Teak species.
,, 27.	Hûlûck,	×
,, 28.	Bhé,	Salix tetrasperma.
,, 29.	Naga Bhé,	Gordonia integrifolia.
,, 30.	Bon Am,	Mangifera sylvatica.
,, 31.	Jarool, or Ajor,	Lagerstræmia Reginæ.
,, 32.	Bhom ruttee,	×

No. 33.	Parolee,	Bignonia chelenoides.
„ 34.	Uriam,	Andrachne trifoliata.
„ 35.	Amaree,	Poma, or Toon species.
„ 36.	Gond Khoroi,	Laurus Sassafras.
„ 37.	Neribee,	Gum Resin Tree (Canarium strictum ?)
„ 38.	Tez Khat,	Blood Tree.

S. F. HANNAY.

Note on the Cotton of the Chittagong District. By A. SCONCE, ESQ., *Bengal Civil Service.*

From an early period,—for the last seventy years, and I know not how long before,—cotton has been an established product of this district. In the earlier times it consisted, generally speaking, of two sorts; that grown in the frontier hills, and that grown in the plains. The latter sort would appear to have been encouraged by the local demand, arising from the manufacture of cotton stuffs in the Government Factory; but since this was abolished, the cultivation of cotton in the interior of the district seems to have been discontinued; at all events the quantity now grown is very limited: and the hill cotton only, from the extent to which it is cultivated, and the trade which it fosters, is worthy of notice.

Cotton is the grand staple of the Joomeas, or hill-people, throughout the extent of our long frontier; from the river Fenny which separates Chittagong from Tipperah, down to Teknaaf, the Arracan border. They are but rude farmers. A hill side is cleared from the surface wood; the land is neither ploughed nor dug, and with the commencement of the first rains, the seed is sown. Rice, gourds, pepper, cotton, are all dropped in the same hole. First ripened, is first reaped. The cotton is gathered in the months of October, November, and December. The same hill is used only for two or three years; when it is abandoned and a new clearance made.

I subjoin an estimate of the quantity of cotton grown during the last two years, giving also the localities, though perhaps it might be sufficient to state the gross result:—

	Crop of 1844-45.	Price.	Crop of 1843-44.	Price.
Futikcherree, ..	8,000 maunds,	2-8	10,000 maunds,	2-0
Runguneah, ..	15,384 ,,	3-4	22,222 ,,	2-4
Sutkuneah, ..	14,285 ,,	3-8	22,222 ,,	2-4
Chukerea, ..	14,000 ,,	2-8	15,555 ,,	2-4
Ramoo, ..	8,333 ,,	3-0	11,111 ,,	2-4
Teknaaf, ..	10,000 ,,	2-8	12,500 ,,	2-0
	70,002		93,610	

This estimate is based not upon a calculation of the lands cultivated or the cotton picked (which under general circumstances is impossible), but upon the traffic, after it has left the hands of the Joomeas, and the capital turned over by the dealers interested in the trade.

The estimate is made of the uncleaned cotton; commonly two-thirds go to seed, and one-third is yielded of clean cotton or *rooee:* but in some sites, chiefly I am informed where the soil is better, the cotton is not only of a better quality, but the bulk and weight of seeds diminish, while the clean cotton increases. In Sutkuneah as much as two-fifths of clean cotton is picked. I observe from specimens now before me, that the staple of the Sutkuneah cotton is finer and longer; but as I have said this is ascribed to the soil, and not to a variety of the plant.

There are always two, often three parties engaged in the transport and purchase of the cotton between the cultivators and its final export from the district. Beoparees from the plains go into the hills to purchase it, either as agents or as principals. It is then stored in *golahs;* and from these *golahs* it is bought by *outside* merchants, residing at Naraingunj (Dacca,) or other towns in eastern Bengal.

The prices which I have given above are the average of the first purchase made by the Beoparees: between them and the Joomeas others often intervene, and of course intercept a portion of the profit. In re-selling the cotton for export the Beoparees make at least one rupee per maund. This year in Sutkuneah the Aurung or Golah price is Rs. 5-8; which is an advance of two rupees above the prime cost. But it is not in this only that the profit of the *home* merchant consists. The Joomeas, however crafty in matters within their own cognizance and under their own controul, are beaten in barter. It is not to be supposed but that they got the worth of their goods, but they got less than what a knowledge of the weights and prices of the plains would enable them to secure. Rude scales are used and heavy weights, 50 or 60 seers to the maund.

Besides the cotton carried out of the district, to which my estimate is chiefly confined, a good deal is left for home consumption. Perhaps the ordinary crop of the district may be expressed at 75,000 maunds seed cotton, or 25,000 maunds cleaned cotton: this would be two millions of pounds.

To the home dealer the purchase of cotton involves an outlay of about Rs. 2,00,000; to the exporters, about Rs. 3,00,000, but much of these sums may be supposed to be one capital, twice used.

At the rate of Rs. 2-8 a maund per seed cotton, the equivalent price in English money would be 2½*d* the pound; one maund of seed cotton would give, say, 12½ seers, or 25 lbs. *rooee* for Rs. 2-8, say 5 shillings; i. e. 5 lbs. to the shilling. This may be taken with sufficient accuracy to shew at what price the cultivators can afford to grow the staple. Some years back much higher prices ruled; the fall is said to be owing to the greater importation and use among native weavers, of English thread. But even now the common retail price of cotton, current in a country where the staple is indigenous, compared with prices in England, seems extremely high. In the Bazars here it sells at 3 seers to the rupee, or 4 annas the pound.

Chittagong, 31*st March,* 1845.

A few hints to Plant Collectors, by Mr. ROBERT ROSS, *Head Gardener, H. C. Botanic Garden, Calcutta.*

[*Note from Dr. Wallich to the Secretary.* I think there are some good hints in the accompanying paper, for Plant Collectors; and I send it to you at the request of its author, Mr. Ross, for insertion in the Agricultural Society's Journal, should you agree in opinion with me as to the merits of the paper.]

The following hints to seed collectors, for this or any other Botanic Garden in India or any hot climate, the result of my own experience in Western Australia, may not be out of place as a sequel to my paper "On the best mode of propagating plants in India," published in the third volume of the Society's Journal, as they are calculated to provide, under certain circumstances, a substitute for Seeds themselves.

Every seed collector knows what trouble and fatigue he must undergo in travelling through the bush or jungle, collecting seeds of the choice plants he may meet with on his way. He sees the plants in flower, and travels many miles to and fro, watching the ripening of the seeds, and after all, perhaps, he is doomed to be disappointed, as many plants, even in their native clime, do not produce seeds every year alike. It is well known some fruit trees do not produce a crop of fruit alike every year; some years they have none or next to none, and some years they have more than enough. I say more than enough, for how often may fruit trees be seen dropping one-third, or more, of their fruit before they are half ripe.

To save the collectors trouble, time, and expense, cuttings might be taken from many of the choice specimens he may meet with, and heeled in a box with about 8 inches of moist friable mould, which he is supposed to carry with him for the purpose. This box might be carried on a bamboo between two or more coolies. One box will hold a good many cuttings of various species, say twenty or so of each; a box three feet long, eighteen inches wide and eighteen inches deep, will hold several hundred cuttings; and cuttings heeled in, in this way, so as not to be too much crowded, will keep fresh for several days, provided they are shaded from the sun. And if they should be found sickly on their arrival at their destination, they will soon recover after being planted under glasses in the sand bed.*

This plan of propagation is only meant for a circuit of three or four days' journey, or twenty or thirty miles in behalf of some botanic or other garden, public or private, which it is desired should be stocked with plants at the least possible expense; and by this plan, there is no waiting for seed to ripen. Cuttings in this climate can be had at any season from most plants, but the operator must understand how to make and select such as will answer. This mode of propagation may appear a strange round-about way to some, but had I not experienced the utility of such a mode myself, I would not attempt to urge its advantages. In a climate like Swan River, a European can expose himself travelling in the bush any day in the year without experiencing any bad effects from the heat of the sun; but in this country one could not do so, from the deadly nature of the climate: therefore such labour must be done most of the year by natives, or those born in, and inured to, the climate.

Hon. C. Bot. Garden,
Calcutta, April 22nd, 1845.

---

* See a paper in the third volume of the Society's Journal, on the propagation of plants from cuttings in sand beds.

On the mode of cultivating and preparing Cacao in the West Indies. *By* MR. A. L. HARRIS.

To the President of the Agricultural Society, Calcutta.

HONORABLE SIR,—Having been informed by a friend lately arrived from Calcutta, that an essay on the growth and culture of the Cacao tree would be acceptable to the Agricultural community, I am induced to take the liberty of laying before you the subjoined brief history of its cultivation and preparation for shipment. There are few, and perhaps no Agricultural or Horticultural pursuits, so delightful as that of the cultivation of the cacao; the sight of its bright foliage, rich in color, varying from light green to a dark red, loaded with yellow and dark red pods, which contain the chocolate bean, are beautiful objects; these are shaded by the "Bois immortel" or the "Erythrina umbrosa" of botanists: (like the "Bignonia" or "Pouie"), this tree at particular seasons throws off its foliage, and is covered with blossoms; those of the Erythrina are of a brilliant red color, justifying its Greek appellation. In this state they are literally dazzling to behold; no objects in the vegetable world look more striking than the alleys of a cacao walk, shaded by a forest above them of the "Bois immortel."

ON THE CULTURE.

Firstly, a nursery is formed, which is a piece of moist land picked out and well cleared of the weeds; this done, the seeds are sowed regularly and in such a manner, so as to contain the quantity of trees required, or even more, the surplus being for supplies; they are then to be covered over with plantain leaves, and allowed to remain so for a few days, till they begin to appear or come forth; then the plantain leaves are to be removed, in order to allow the cacao trees to spring up well: when they arrive to the height of *from 12 to 18 inches, they are then fit for transplanting; great care must be taken to remove them with a shovel, in order that the soil may not be broken from the capillary roots.*

TO FORM A CACAO ESTATE.

It is essential that the land is very good, flat, and if possible close to streams of water; as soon as the land is cleared and burned, the same is then planted with "Shade" first, that is to say, with trees called by the French, "Bois Immortel" and by the Spaniards, "Anancos," or "Madre de Cacao," (mother of Cacao,) it being a tree that grows to a very great height and bears a red pea, at the same time affording the best of shade, cacao requiring the same; they are planted at right angles, and at about from 30 to 40 feet apart; this done, the small cacao trees are then put in, (after the ground has been perfectly lined,) and planted in rows, of from 12 to 15 feet apart. Coffee, plantains, and manioc are also planted among them, to afford a perfect shade, till the "Immortel" is able to afford a necessary shade itself, then the plantains and manioc are dispensed with, the coffee being left.

As soon as the cacao attains its third year, provisions are no more planted among them, as the trees will then require *air;* the coffee trees are to be planted so as not to grow higher than four feet, which will enable them to bear the more.

Cacao begins to bear the fourth year, but when it arrives at its seventh year it is then at its full strength and bearing; three English acres of land ought to contain 900 cacao trees, not more.

A cacao estate is weeded twice a year, June and December, with a cutlass; there are two crops of cacao in a year, June and December, the latter is considered the best; but there are what the Spaniards call "Robusco" or small pickings, all the year round.

MODE OF PREPARING.

As soon as the cacao, which grows in large pods, is ripe, the men are put to pick it; this is done by a pole of 3 inches diameter, at the end of which a cacao knife is attached. The cacao as it falls on the ground, is gathered by the women and children who follow picking it up in baskets, and piling: when it is all picked and put in one large pile, task work is given, which is, each person is to scrape the beans clean out of the pods. When it is once scraped clean out it is conveyed to the *swet house*, where it remains three or four days, according to the color required; at the end of this period it is put out in the sun in a house made for the purpose, being 50 or 60 feet long and 18 feet wide, the roof of which moves on wheels; once in the house, one person is sufficient to mind it, it requires three days in a good sun to dry it, after then it is fit for immediate use, it is then put into bags for shipment.

Fifteen to twenty laborers are sufficient for an estate of 30,000 to 40,000 trees, which quantity of trees will give annually from 800 to 900 bazar maunds of cacao, and the expenses for carrying on such an estate would be from 2,000 to 2,400 Rs. per annum, including every thing.

The establishment of a cacao estate, or rather works, are but few and simple, and require very little outlay, being only a curing or swet house, a store, a cacao house for drying, and four or five head of cattle. The profit derived from a cacao estate is not as much as from a sugar estate, but gives a fair remuneration, and free from all accidents, as even fire will do it no harm, for should the trees burn, the same will spring forth afresh; thus there is neither the anxiety nor the outlay experienced as in sugar.

With the hope that the foregoing details may prove serviceable,

I am, &c.

A. L. Harris.

P. S.—Coffee is almost always grown among the cacao trees in the West Indies and Spanish Main, as it assists to shade the cacao at first, and it would be considered very unprofitable to remove them at their maturity.

A. L. H.

London, 18*th April*, 1845.

Further remarks on certain varieties of Sugar-cane. By J. V. Thompson, *Esq.*, M.D. *Deputy Inspector General of Hospitals at Sydney.*

Dear Sir,—In fulfilment of my promise to Dr. Spry of sending a further communication on the subject of Sugar-cane, I have now the pleasure of making good my promise.

In my former paper on this subject,* I brought forward proofs from Mons. Cossigny's work "Ameliorations des Colonies," that the cane now principally cultivated in the Mauritius is not the Otaheitean but the Batavian, "Cannes blanches" of that gentleman, which he introduced together with the other Batavian canes direct from Java in 1782, and not only distributed the Cannes blanches, (rather jaunes) to Bourbon, but sent them to Cayenne, Martinique, and Saint Domingo in 1788 and 1789.

Having since directed my attention more particularly to the subject of the Mauritius-canes, I find that when the French were expelled from Madagascar by the natives in 1657, they are stated to have carried with them to Bourbon, where they first established themselves, the Sugar-canes of Madagascar, which was probably one or other of the two yellow varieties which stand at the head of the appended list; from Bourbon the French subsequently removed to the Mauritius, of which they possessed themselves in 1715, so that the Madagascar canes became in all probability the general stock of the two Islands. I feel quite satisfied that with such fine canes the French would give themselves no trouble to introduce others from so great distance as Otaheite.

---

* This paper is published in the first volume of the Journal.—*Eds.*

The two kinds at present cultivated there, *viz.*, the Madagascar and the Batavian yellow cane, although probably so much alike as to lead to their being confounded together, have no doubt characters sufficient to distinguish them from each other, which any intelligent member of the Society can now do, as they have been abundantly introduced from both the Mauritius and Bourbon, and cultivated to a considerable extent in the Society's Nursery grounds for many years, under the appellation of Mauritius, Bourbon and Otaheite cane. They may now be further compared with the genuine Otaheite cane, which was successfully introduced from that Island several years ago. Subsequently I also received a box of canes from Otaheite, which I am happy to say are doing well, and consist of four different varieties, viz:

1. A large pale yellow cane, (Cannes blanches ?)
2. A large purple cane.
3. A large reddish yellow cane.
4. A good sized striped cane.

I have received canes of the same description from Batavia, but I entertain doubts of their identity with the Otaheitean canes, or with any of the Madagascar canes of the unmixed list.

Independent of the canes introduced by the French into their islands originally, there exist in the great island of Madagascar a very considerable number of other fine varieties of the Sugar-cane, many of them very remarkable for their size and beauty, and of all which the natives appear to know the respective qualities irrespective of sugar making; as they appear to differ much in precosity, product, sweetness, hardness, &c. &c. some being best grown on the alluvial banks of the rivers, others on the drier slopes of the mountains, others again in the wet and swampy flats. As the cane is only grown by the natives of Madagascar for eating and for making intoxicating drinks by fermentation or distillation, and consequently not upon any great or extended scale, it is most probable that the various kinds originate in seminal varieties naturally produced, from many of the plants being neglected and allowed to run to seed.

While Government Agent at Madagascar from 1813 to 1816, I was instructed to collect and forward to the Botanic Garden at the Mauritius, all the varieties of Sugar-cane I could obtain in duplicate, of which the appended is a detailed list of those so procured, which I succeeded in conveying safely, and delivering in a healthy and growing state in 1815, to the Superintendent of the Mauritius Garden at Pamplemouse. As I left the Island in 1816, I am unable to state the fate of these kinds, but suspect their value not being appreciated, they attracted little attention, and have probably been dispersed or lost.

I am, dear Sir, very faithfully yours,
J. V. THOMPSON,
Deputy Inspector Genl. Hospitals.

Sydney, Jan. 18th, 1845.

List of Sugar-canes introduced into Mauritius from Madagascar in 1816, *alluded to in the preceding paper.*

A. Yellow canes.

No. 1. * Fary-baymayvow (large yellow, Malg.) a large yellowish cane, probably identical with the original Mauritius and Bourbon cane.

---

* Fary is the Malgache generic name of the Sugar-cane, to which they join a distinctive appellation descriptive of size, colour, &c.

No. 2. Fary-andrafow, a moderate sized cane, of a pale yellowish colour.

No. 3. Fary-carowk, a moderate sized cane, of a beautiful bright orange colour when ripe, so called from its colour resembling that of the beak of the little ground-parrot.

No. 4. Fary-boubaya, of a moderate size and of a yellowish colour, slightly tinged with red. N. B. Like one of my Otaheite canes.

No. 5. Fary-boubaya mayna, a variety of the above, more deeply tinged and with a brighter red. (Mayna red, Malg.)

No. 6. Fary-Vonlon (Malgache name of bamboo) extremely large, with long joints, and of a greenish yellow colour, 3 inches in diameter ! !

B. Red or Purple canes.

No. 7. Fary-Carang (Prawn coloured), a large cane, of red colour above, and of a dark reddish purple towards the root, so called from its predominating colour being like that of the boiled shrimp.

No. 8. Fary-androfow mayna (red andrayfow, Malg.) a red variety of No. 1 by its Malgache name, which I doubt, and consider it a distinct variety, is only of a moderate size, with long joints of a purplish red colour, deeper towards the root.

No. 9. Fray-maëntee (black-coloured, Malg.) a large cane, of a very deep reddish purple colour. N. B. Resembles the purple Batavian and Otaheitean canes.

C. Striped canes.

No. 10. Fary—(distinguishing name obliterated in my manuscript,) a large cane, with reddish purple stripes on a dark purple ground.

No. 11. Fary-ahombee (Bullock's-horn, Malg.) a very large cane, next in point of size to No. 6, Bamboo cane, both in size and marks, resembling a bullock's horn, colour mixed stripes and shades of a yellowish and reddish purple.

No. 12. Fary-mang-indavolan, or Fary-Ginghan (Ginghan cane,) rather a large cane, of a dark reddish purple below and striped above, with a yellowish red on a bright reddish purple ground.

No. 13. Fary-Feesweet (Comb-striped, Malg.) of a moderate size, more closely and regularly striped, with a yellowish and a purplish red colour.

There are doubtless many more varieties of which I saw two or three, but did not procure sets, being *en route* at the time of their offering themselves to my notice.

J. V. Thompson.

On a method of ascertaining the amount of Crystallizable Sugar in Khar or Muscovado. By J. W. Laidlay, *Esq.*

The great extension of the sugar manufacture in this country having induced many persons to engage in the purchase of the raw material or *Khar*, whose practical experience of its value is very limited, I have been led to think that the following ready and convenient method of ascertaining the amount of crystallizable sugar in the unrefined material, could not fail to be useful in assisting their labours. There are indeed chemical means of ascertaining this point with much greater certainty and precision; but these are too operose for most people, and would consume more time than the man of business, even if skilled in manipulation, could very well spare; objections which do not accompany the method now under consideration.

Its principle is this: if a given weight of pure sugar be dissolved in an equal weight of water, a solution will be obtained whose specific gravity will be 1.2299 at 84° Fahrenheit. But if, for the sugar, an equal weight of molasses be substituted, the solution will have a specific gravity of only 1.165, or thereabouts. Now any admixture of these substances, as in Khar, will produce a solution, whose density will be intermediate, being greater or less according as the sugar or the molasses predominates; and all that is necessary to determine their relative proportions is a table founded upon a sufficient number of exact experiments, showing the density of such solutions of sugar and molasses in every necessary proportion.

The principle is obvious enough. It may be objected however, that though this method will indicate with sufficient nicety the proportions of sugar and molasses where these exist in a state of purity, yet there are frequently foreign substances present in *Khar* which greatly affect its value, such as sand or dirt, fraudulently added to increase the weight. This is quite true; but as such adulterations are for the most part insoluble, they fall to the bottom, or may be separated by filtration, and thus the density of the solution is diminished; so that they by no means escape detection by this test.

In drawing up the subjoined table it was necessary in the first place to determine the average or normal condition of sugar and molasses. In regard to the former, there was no difficulty; good London loaf sugar may be taken as an unexceptionable standard. That which I used when thoroughly dried by long exposure to a current of air heated to 120° Fah. gave with an equal weight of water a perfectly colourless and limpid solution, whose specific gravity was 1.2299 at 84° Fah. corresponding precisely with Dr. Ure's determination, of the density of such a syrup, 1.2310 at 60° Fah. But with regard to molasses, a fluid extremely sensible of hygrometric changes, it is not so easy to determine its average condition. From a number of experiments, I think the medium density is about 1.37 to 1.38. Some molasses of this strength exposed to an atmosphere saturated with humidity, fell in a week to 1.36, at which strength there was manifested a strong disposition to fermentation; a further exposure for a week reduced it to 1.31, when an active fermentation ensued, and the attenuation proceeded rapidly in a few days to 1,289. It may be assumed therefore, that molasses cannot be kept much below 1.36 without a tendency to decomposition.

One hundred grains of the same molasses (sp. gr. 1.37) were dried over sulphuric acid at the ordinary temperature and pressure. It thus became very thick, and lost *11.8 grs.* On again exposing this to the air, it regained its original weight in less than twenty-four hours, although the day was a sunny and dry one. I think therefore, that I am not far wrong in assuming the average specific gravity of molasses at 1.37 to 1.38: that which I used in framing the subjoined table had a density of 1.3740, and formed with an equal weight of water a solution whose specific gravity was 1.1656.

Having explained the principle, it now only remains to describe the mode of applying it in practice. For this purpose are required a small set of scales and weights, and a stoppered phial containing from 500 to 1000 grains of water when the stopper is in its place. Having ascertained exactly the weight of water the phial will contain, weigh an equal amount of the Khar, and dissolve it (in a somewhat larger bottle) in a measure of water from the stoppered phial; fill the latter and weigh, when the weight of the solution divided by the weight of pure water which the phial will contain, will give the specific gravity. On referring to the following table the per centage of sugar corresponding with the specific gravity will be found, and will not in general differ very much from the truth.

Sugar.	Molasses.	Specific gravity.
100	0	1.2299
99	1	1.2292
98	2	1.2285
97	3	1.2279
96	4	1.2272
95	5	1.2266
94	6	1.2259
93	7	1.2253
92	8	1.2246
91	9	1.2240
90	10	1.2233
89	11	1.2227
88	12	1.2220
87	13	1.2214
86	14	1.2207
85	15	1.2201
84	16	1.2194
83	17	1.2188
82	18	1.2181
81	19	1.2174
80	20	1.2168
79	21	1.2161
78	22	1.2155
77	23	1.2148
76	24	1.2142
75	25	1.2135
74	26	1.2129
73	27	1.2122
72	28	1.2116
71	29	1.2109
70	30	1.2103
69	31	1.2096
68	32	1.2090
67	33	1.2083
66	34	1.2077
65	35	1.2070
64	36	1.2063
63	37	1.2057
62	38	1.2050
61	39	1.2044
60	40	1.2037
59	41	1.2031
58	42	1.2024
57	43	1.2018
56	44	1.2011
55	45	1.2005
54	46	1.1998
53	47	1.1991
52	48	1.1985
51	49	1.1978
50	50	1.1972

The reader must be apprised, however, that the foregoing table refers only to Muscovado, and not to *Dulooa*, or Khar which has undergone an operation analogous to claying. The reason of this is obvious: the molasses is removed by this process, and a portion of water occupies its place; and the latter being a lighter substance, will reduce the specific gravity of the solution, and so give rise to considerable error. For the same reason Khar that from exposure to excessive humidity has parted with its molasses, and diliquesced, cannot be valued in this way, as the amount of sugar indicated will be too small. The following table, showing the effect of hygrometric moisture in reducing the density of solutions of sugar and water in equal proportions, may not be altogether useless in a climate subject to such extremes as that of Bengal.

Hygrometric water.	Sugar.		Hygrometric water.	Sugar.	
0	100	1.2299	6	94	1.2128
1	99	1.2271	7	93	1.2099
2	98	1.2242	8	92	1.2071
3	97	1.2214	9	91	1.2042
4	96	1.2185	10	90	1.2014
5	95	1.2156			

Further Correspondence connected with the experimental Cotton cultivation in the District of Dacca.

(Communicated by the Government of Bengal.)

From the Under Secretary to the Government of Bengal, to JAMES HUME, *Esq. Honorary Secretary, Agricultural and Horticultural Society.*

SIR,—In continuation of my former letters on the subject of the experimental cotton cultivation in Dacca, I have the honor to forward a box containing sundry parcels of cotton which has been recently sent down by Mr. Price, and which the Society are requested to examine and report upon.

2. I have also the honor to annex further correspondence on the subject.*

To Secretary Sudder Board of Revenue, No. 877, 16th October.
From ditto, No. 406, 14th October, with enclosure.
From Commissioner of Dacca, No. 378, 11th October, with enclosure.
To Secretary Government, Fort St. George, No. 256, 23rd October.
From Commissioner of Dacca, No. 39[illegible] 4th Nov. with enclosure.
To Secretary Sudder Board of Revenue.
To Governor General's Agent.
this date.

I have, &c.
C. BEADON,
Under Secy. to the Govt. of Bengal.

Fort William, 20th Nov. 1844.

---

* These specimens and papers were transferred to a competent party to examine and report on, but were unfortunately lost or mislaid before a report was prepared. This will account for the delay in the publication of the correspondence, of which duplicate copies have been recently furnished by Government.—EDS.

No. 877.

From the Under Secretary to the Government of Bengal, to the Officiating Secretary to the Sudder Board of Revenue.

SIR,—In continuance of my letter, No. 643, dated the 5th August last, I am directed to request that with the Board's permission you will intimate without delay to the Commissioner of Dacca, that the instruments mentioned in the list which accompanied Mr. Price's letter of the 21st June, (with the exception of the Saw Gin and Screw Press,) will be despatched in a few days by boat to his address at Dacca.

2. An application has been made to the Government of the North Western Provinces for such implements and machinery for the culture and preparation of cotton, as are not required in those Provinces; and it is considered not improbable, that a Gin and Screw Press may be spared for Mr. Price's use.

I have, &c.
(Signed) C. BEADON,
Under Secy. to Govt. of Bengal.

Fort William, 16*th Oct.* 1844.

No. 406.

From the Officiating Secretary to the Sudder Board of Revenue, to F. J. HALLIDAY, ESQ. *Secretary to the Government of Bengal, Revenue Department.*

Mis. Dept. Present
J. Pattle, and J. Lowis, Esqs.

SIR,—I am directed by the Sudder Board of Revenue to submit herewith, in original, for the perusal of the Right Honorable the Governor of Bengal, a report of Mr. J. O. Price's proceedings in respect to the experimental culture of cotton in the Dacca division, during the past month of September; and with reference to Government Orders of the 3rd of that month (No. 742) to take this opportunity of stating, that in consequence of enquiries made through the General Post Office, it has appeared that the letter of the 7th of June last, to the address of the Commissioner of Dacca, referred to in the Board's letter to Government, (No. 335) dated the 27th August following, as having miscarried, had duly reached its destination, and that the Commissioner's application for a copy of it originated through a mistake of his own.

2. With reference to the concluding para. of Mr. Price's report, I am desired to intimate, that the Government Orders of the 11th ultimo, No. 755, authorizing the transfer of certain farming implements, &c. from Mr. Terry of Rungpore, were communicated to the Commissioner of the Moorshedabad division on the 13th idem, No. 122.

I have, &c.
(Signed) GEORGE PLOWDEN,
Offg. Secretary.

Fort William, 14th Oct. 1844.

From J. O. PRICE, ESQ. *to* J. DUNBAR, ESQ., *Commissioner of the Dacca Division.*

SIR,—I have the honor to submit to you, for the information of His Excellency the Governor General of India, the monthly report of my proceedings for the month of September.

In the early part of this month I was engaged for some days visiting several places to the westward of the river Dhullessury, once famous for growing largely the small Dacca kupas, and at which place a considerable quantity is still grown; but I went too soon to judge much of the lands, the inundation not having quite receded from the lands most used in cultivating the cotton plant, but it is my intention to again visit that district early in the ensuing month.

I next proceeded to examine some lands in Run Bhowal Zemindary, also called Berunja Division, and situated on the river Banar; these lands had escaped my observation when I went up that river before being over-run much with jungle, but on examination I found them to consist of the richest black soil I have yet seen in this district, and where the natives have cleared any of it off, they all grow kupas with three or four crops mixed with it, and that with little or no cultivation after they put the seed into the ground.

On my return to Dacca, I went up the river Dhullessury for the purpose of examining the small patch of cotton I have at Foolbareea, and it affords me much pleasure in informing you that the American kind is bearing abundantly, and had it been planted in a proper season of the year, so as to have yielded its cotton in the dry months, it would have been very fine; but cotton picked in a wet season is always very inferior to what it otherwise would have been. The Bourbon seed I planted at the same place, and at the same time, I have cut down to the height of three feet as an experiment, it having run too much to wood, and for nine months, which is the length of time since it was planted, has never yet blossomed; it is now sending out fresh branches, so that I hope it may bear well in the dry season. This system I have never seen tried in the United States, but I am satisfied there is much information to be obtained respecting the cultivation of Foreign Cotton in this country, which can only be acquired by an experimental system of cultivation.

The Cotton seed from the Agricultural and Horticultural Society having arrived in proper time for the October planting, I hope the farming implements will also soon arrive.

I have, &c.
(Signed) J. O. PRICE.

Commissioner's Office, Dacca Division,
Dacca, the 2nd October 1844.

No. 378 of 1844.

From J. DUNBAR, ESQ., *Commissioner of Dacca, to the Secretary to the Government of Bengal in the Revenue Department, Fort William.*

SIR,—I have the honor to transmit a copy of letter from Mr. Price, cotton planter in this district, applying for a supply of from eight to ten maunds of cotton seed for the May and June sowings. Dated 10th Oct. 1844.

2. As the Agricultural Society do not appear to have any available seed, I would suggest that the seed indented for may be procured from Coimbatore. It is desirable, that some portion of it should be of the kinds particularized by Mr. Price.

I have, &c.
(Signed) J. DUNBAR,
Commissioner of Revenue.

Commissioner's Office, Dacca Division,
Dacca, the 11*th Oct.* 1844.

To J. DUNBAR, ESQ., *Commissioner of the Dacca Division.*

SIR,—I beg leave, in reply to your letter No. 315, to state to you, that I think if possible it would be well to obtain from eight to ten maunds of cotton seed from Coimbatore or elsewhere, in time for the May and June planting. I should like much a part of it to be Tenessee and Sea Island, so as to give these kinds a trial also in this district.

I have, &c.
(Signed) J. O. PRICE.

Dacca, 11*th Oct.* 1844.

No. 256.

From the Under Secretary to the Government of Bengal, to the Secretary to Government, Fort St. George.

SIR,—I am directed by the Right Honorable the Governor of Bengal, to annex copy of a letter from the Commissioner of Dacca, dated the 11th instant, and of its enclosure, relative to cotton seed required for the Government experimental cotton culture in that district, with His Honor's request that the Most Noble the Governor in Council will be pleased to direct the issue of such orders as will ensure the early supply of the cotton seed from Coimbatore in the quantity and of the kinds specified.

I have, &c.
(Signed) C. BEADON,
Under Secy. to the Govt. of Bengal.
Fort William, 23rd Oct. 1844.

No. 397 of 1844.

From J. DUNBAR, ESQ., *Commissioner of Dacca, to the Secretary to the Government of Bengal, Fort William.*

SIR,—I do myself the honor to transmit herewith a copy of Mr. Price's report for the past month.

2nd. You will observe that no measures have been taken for the immediate establishment of the Experimental Cotton Farm. Finding that the quantity of seed at his disposal was far too small to admit of his laying down in cotton, any thing like the whole area which it is proposed to comprise within the farm, and having received none of the farming implements for which he had indented, Mr. Price consulted me on the expediency of postponing the experiment on a large scale till he should have at his command adequate means for carrying it out effectively, and giving it a full and fair trial. I agreed with him in thinking that, under existing circumstances, this was the wisest course which could be adopted, and that he could not do better, in the meantime, than to make arrangements for the cultivation of a number of beegahs proportioned to the seed in hand, on the lands of the Indigo planters, zemindars and others, who had promised their assistance and support. Mr. Price intimates, that he will give a detail of these arrangements in his next report.

3rd. Upon the whole, I do not think, that this delay in the establishment of the Government Farm is to be regretted. During the past twelve months, Mr. Price has no doubt seen a good deal of the District, and satisfied himself to a certain extent, in regard to the qualities of the soil in various places; but his actual experiments in the growth of Cotton, were on so very limited a scale, that his opinions may yet undergo a considerable change. It seems to me questionable, (and this is admitted by Mr. Price,) whether the suitableness of the soil and climate of this District to the cultivation of Foreign Cottons, can be properly tested without having two Experimental Farms; one to the north, on the banks of the Banar, where the seed is sown in May and June, and one in the southern parts of the District, where the seed is committed to the ground, soon after the retirement of the annual inundation. Upon this point, Mr. Price will be able to speak with more certainty, sometime hence; and in the event of his deeming it advisable to have two plantations, I suppose there will be no objection to the measure.

4th. Mr. Price has been disappointed in not receiving a hand Saw Gin from Mr. Terry the Cotton planter at Rungpore. If they can be procured in Calcutta, I think it would be well that several Gins of this kind should be sent up.

5th. As no house could be procured at a moderate rent in Dacca, suited to Mr. Price's purpose, I authorized his hiring a house in Naraingunge. That place is much more accessible to boats of any burthen during the dry season, than Dacca; and in the event of the present experiments resulting in complete success, I think it is there we should have the machines for cleaning the Cotton and the godowns for storing it.

6th. Mr. Price is anxious to have an Apprentice, and I certainly think it is advisable that he should have assistance of this kind. As the cultivation extends, it will be more and more difficult for Mr. Price if wholly unaided, to look after it properly. With the permission of Government, I will therefore look out for an intelligent young man, educated at one of the Government institutions. A salary of Rs. 20 or 30, per mensem, would be enough in the first instance.

7th. The box containing sundry parcels of Cotton referred to in Mr. Price's report, has been despatched by this day's dawk banghy. As far as I am able to judge, the samples appear to be such as to afford good hope of ultimate success. It would be satisfactory, however, to learn what is thought of them by the Agricultural Society.

8th. I take this opportunity of stating that, when the Experimental Farm is fairly entered upon, I think it very desirable that a body of able-bodied Dhangurs, or hill coolies, with their families, should be sent hither, for the purpose of cultivating it. I have consulted Mr. Price on the subject, and he agrees with me in thinking that a body of these men would be particularly useful for the purposes of the Farm. The men would till the ground, and rear the plant under Mr. Price's directions, and the women and children would be of the greatest use in cleaning and picking the Cotton, when arrived at maturity. If the Right Hon'ble the Governor approves of the suggestion, I would respectfully recommend that measures may be taken for having the required number of Dhangurs sent up towards the close of the cold weather.

I have the honor to be, &c.

(Signed) J. DUNBAR,
Commissioner of Revenue.

Commissioner's Office, Dacca Division,
Dacca, the 4th November, 1844.

To J. Dunbar, Esq., *Commissioner for the* 15*th or Dacca Division.*

Sir,—I have the honor to submit to you, for the information of His Excellency the Governor General of India, the monthly report of my proceedings for the month of October.

Having not yet received any part of the farming implements for the cultivation of the Government Experimental Cotton Farm in this District, and having consulted J. Dunbar, Esq. Commissioner of Dacca Division, on the propriety of confining my proceedings at present to that of the Ryuttee system of cultivation, and finding his opinion to coincide with my own, not only on account of want of farming implements, but also that of the limited quantity of Cotton seed forwarded by Government; I have therefore been, for the greater part of this month, engaged in making the necessary arrangements with the Zemindars for doing so, and in distributing the Foreign Cotton seed in my possession, in such a way as I trust may be the means of carrying out effectually, and successfully, the Ryuttee system of Cotton cultivation in this District. I intend therefore to defer the cultivation of Cotton on the Experimental Farm, until the month of May or June which is the season best suited for the cultivation of Cotton lands on the river Banar, in which locality I wish to establish the Farm, and in the intermediate time to make the necessary preparations for doing so. I cannot yet state exactly the number of beegahs of land I will have in Ryuttee cultivation, as the long holidays have prevented my getting the Cotton seed planted, but I hope in the course of ten days to have it all in cultivation. I will therefore, in my next report, be enabled to name the number of beegahs I have in cultivation.

3rd. On the 11th instant I received a few farming implements, and four bags of Cotton seed from Mr. Terry, Government Cotton planter at Rungpore; two bags were of Bundlecund seed, and two bags of Mexican: the former, I regret to say, is not worth planting; but the latter two bags are fresh and good, and I am glad to say will afford me an opportunity of also giving that kind of Cotton a trial in this District. I regret much, that he did not send me one of the two hand Saw Gins that he informed me he had belonging to Government, as it would have afforded me an opportunity of introducing it among the Ryutts who have planted Government seed. If such a thing is to be had in Calcutta, I hope it will be added to that of the list of implements required for the Government Experimental Cotton Farm.

4th. I have, with the sanction of J. Dunbar, Esq. Commissioner, rented a house at Naraingunge for Government Cotton stores, &c. &c.; also to erect the large Saw Gin in, when it arrives. This place I consider the most central in this District, and consequently the best suited for the erection of machinery of that kind, besides it is a very large bazar, to which place a considerable quantity of Cotton is brought from the southern part of Lower Bengal.

5th. I have also had the honor to represent to J. Dunbar, Esq. Commissioner, the necessity of having a young man apprenticed to Government from a poor school or otherwise, whom I will instruct in the American system of Cotton cultivation, and who will, in case of my absence from indisposition, business or otherwise, from the Experimental Farm, be able to report to me, so as to enable me to report faithfully to Government.

6th. This report is accompanied with a box containing sundry parcels of Cotton grown at different places in this District from American Cotton seed, also a few bowls unpicked, so as to enable His Excellency to judge in some measure of the prospects of success in the cultivation of Exotic Cotton in this District. With respect to strength of staple, and colour of the Cotton, great allowance must be made on account of its having been grown by persons unacquainted with Cotton cultivation, who in my absence allowed it to remain on the shrub until more or less injured by rain, and in some measure bleached. Had this not been the case, it would have been, in my opinion, superior to the Cotton sent to me from the Agricultural and Horticultural Society, which sample I also send in the box, and which was reported to be equal to New Orleans Cotton; and now that an advance is allowed by Government on the growth of Exotic Cotton in this District, and that the Ryutts are to be paid for it in proportion to the quality of the Kupas delivered to Government, I hope through my exertions to be able to convince the Ryutts not only of the necessity, but also the benefit they will derive by picking it at a proper time.

I have, &c.

(Signed) J. O. PRICE.

Dacca, Oct. 31st, 1844.

No. 969.

To the Secretary to the Sudder Board of Revenue.

SIR,—With reference to Mr. Commissioner Dunbar's Letter No. 397, dated the 4th instant, which should have been submitted through the Board, and of which a copy is now enclosed for their information, I am directed to state that the Governor of Bengal approves of the postponement of the Experimental Farm until next season, when Mr. Price will have had further opportunities of extending his enquiries into the quality and capabilities of the various soils and sites in the vicinity, and the necessary arrangements for commencing operations on a larger scale will have been completed.

2nd. The implements indented for by Mr. Price, regarding which you were addressed on the 16th ultimo, were despatched to Dacca on the 18th instant. The Government of the N. W. Provinces have likewise been requested to transfer to Bengal for Mr. Price's use all the farming implements purchased for the use of the American Cotton planters, but now no longer required in that quarter. And Mr. Terry, the period of whose engagement expires in April next, will be directed to make over the implements belonging to the Government, in his possession.

3rd. The box containing Cotton seeds has been received at this office, and forwarded to the Agricultural Society for examination and report; and the Governor General's Agent on the S. W. Frontier will be addressed on the subject of providing Dhangurs for the purposes mentioned by Mr. Dunbar.

4th. The Governor approves of the Commissioner having authorized Mr. Price to hire a house at Naraingunge for cleaning and storing the Cotton. In His Excellency's opinion, however, it was premature to secure a house before the implements were received, or any large quantity of Cotton gathered, and the rent of the house ought to have been stated.

5th. Application will be made to the Supreme Government to sanction the employment of an Apprentice on a salary of Rs. 20 a month.

I have, &c.
(Signed) C. Beadon,
Under Secy. to the Govt. of Bengal.
Fort William, the 20th Nov. 1844.

No. 282.

To Lieut.-Col. J. R. Ouseley, *Governor General's Agent, South Western Frontier.*

Sir,—The Commissioner of Dacca having applied for the services of several able-bodied Dhangurs, with their familes to be employed in the Experimental Cotton cultivation now in progress at Dacca, I am directed to request that you will place yourself in communication with that Officer, and take such measures as you may deem proper for sending to Dacca the number of people of that class that he may require.

I have, &c.
(Signed) C. Beadon,
Under Secy. to the Govt. of Bengal.
Fort William, the 20th Nov. 1844.

No. 428.

From the Under Secretary to the Government of Bengal, to the Honorary Secretary to the Horticultural Society.

Sir,—In continuation of my letter, No. 869, dated the 16th October 1844, I am directed to forward, for the Society's use, a copy of Mr. Price's reports from November to April last.

I am, &c.
Cecil Beadon,
Under Secy. to the Govt. of Bengal.
Fort William, 28th May, 1845.

Sir,—I have the honor to submit to you, for the information of His Excellency the Governor General of India, the monthly report of my proceedings for the month of November.

2. On the 2nd instant I left Dacca, and proceeded to Phoolbariah, for the purpose of planting Cotton seed; but finding the land not sufficiently prepared, I went from

thence to Manickgunge, at which place I remained until a part of the land at that place was sufficiently cultivated to receive the seed, and which I planted for the purpose of instructing the natives how to proceed with the remainder of the land that would not be ready for planting for a few days. On my return to Dacca I remained a few days at Phoolbariah, until I got a part of the land there sufficiently prepared for planting, which I planted, so as also to instruct the Ryuts there how to proceed with the remainder of the land, at that time not sufficiently cultivated. I had much pleasure a few days ago in hearing that the seed planted at that place had vegetated well, and was looking healthy; I have not yet heard any thing from Manickgunge respecting the seed planted there, but as they had the same seed, I hope on my visiting that place to find it also looking well.

3. On my leaving Phoolbariah I next proceeded to the district of Bickrampore, at which place I have got some land in cultivation, and which the Ryuts are now preparing for the seed. The land in that neighbourhood is very fine, but the paddy crop prevented my getting it cultivated sooner.

4. I next proceeded to Sonargong, at which place I will have from ten to fifteen beegahs of land in Cotton cultivation, and which the Ryuts are busily engaged in preparing. I therefore hope in a few days to have it all planted.

5. I have Cotton also planted on the Luckhia and two other places; but as I have not been able to visit either of them in this month, I cannot report on them, but will duly do so in my report for the month of December.

(Signed) J. O. Price.

Dacca, November 30th, 1844.

Sir,—I have the honor to submit to you, for the information of His Excellency the Governor General of India, the monthly report of my proceedings for the month of December.

2. Early in this month, I visited the locality of Sonargong, and found the Ryuts busily engaged in preparing the land I have in Ryutee cultivation at that place for the reception of cotton seed that they had been supplied with.

3. I next proceeded to the pergunnah of Bickrampore, at which place I found better than half of the land I have in cultivation there already planted, and the remainder ready for the seed.

4. On my leaving Bickrampore I next visited Naraingunge, at which place I have also tried a little of the Mexican seed received from Rungpore, which is partially vegetating.

5. On the 19th instant I proceeded to Dacca, for the purpose of taking charge of sundry packages of farming implements received from Government, for the use of the Experimental Cotton Farm or farms in this district, which are all well suited for the purposes they are intended for, excepting a carpenter's tool-chest, which is so small, and so few tools in it, as to be of no service in erecting either a cotton gin or cotton press; in fact, it does not contain any of the strong tools required for erecting machinery, such as large anchors, screws, vice, &c. &c.

6. I next visited Phoolbariah, at which place I have cotton seed planted on both sides of the Dhullessury, and on my arrival at that place I was truly sorry to find none of the New Orleans seed had vegetated, and very little of the Mexican kind had done so, although planted early in this month; and I also regret to state that the seed has not succeeded any better at Manickgunge; indeed I find it is worse than useless planting old cotton seed in this district, and I am afraid

that the full plant will be little better than a total failure. It may be remembered that Phoolbariah was one of the places at which exotic cotton seed was planted by me last year, and succeeded so well; it has been yielding for five months, and is now loaded with bowls, that will open during the ensuing month, which is a convincing proof that the present failure is not occasioned either by soil or climate.

7. With respect to the correspondence I had the honor of having with you respecting the utility of having two Experimental Farms in this district instead of one, namely, one in the northern part of it where the land is high, and the seed planted in May and June, and the other to the southward where the land is low and the cultivation commences as soon as the annual inundation recedes sufficiently to admit of doing so, I have much confidence in agreeing with you that it will not only be the most satisfactory, but also the most advantageous way of becoming thoroughly acquainted with the different localities best suited for the cultivation of foreign cotton seed in this district; besides it will afford the double advantage of having fresh cotton seed twice in the year instead of once. This will be of much service, I hope, as it appears to me, that after the American seed is kept for a short time in this district, it deteriorates very quickly. The native cotton seed retains vegetation much longer than that of the large American kind, which I think is occasioned by its smallness, and that of the husk being much stronger, which defends it against this climate; still the natives here are aware of the difficulty of retaining the germinating quality in cotton seed for any length of time; they consequently go to the trouble of putting it into earthen vessels and securing it from the air in various ways, and afterwards hang it up in their houses, over the place they make fire, which of course keeps it dry and prevents it from suffering from the humidity of the climate of this district.

8. It is to be regretted much the present failure in the first attempt at a Ryutee system of foreign cotton cultivation in this district from old seed, as it will no doubt tend to damp the enterprize of those Ryuts who have in this instance tried it, as also those in the neighbourhood of which it has been tried; but now that the implements have arrived to establish the Government Experimental Cotton Farm, I feel confident, by being enabled by that means to supply the Ryuts with fresh acclimated seed, their confidence will soon be restored, without which it is impossible in my opinion to carry out the views of Government to a large extent.

(Signed) J. O. PRICE.

Dacca, 31*st Dec.* 1844.

SIR,—I have the honor to submit to you, for the information of His Excellency the Governor General of India, the monthly report of my proceedings for the month of January.

2. I regret much being obliged to inform you, that my visits during this month to the several places at which I have planted cotton seed has confirmed the opinion I expressed in clause No. 6 of my report for the month of December, namely, that from the inferior quality of the cotton seed planted, that the present attempt at establishing a Ryutee system of cotton cultivation would be little better than a total failure; a small portion of the seed planted partially vegetated for a time, but from want of substance in the seed from which it sprung it soon disappeared again, not having sufficient strength to contend with the long continuation of dry weather we have had in this district.

3. I have much pleasure in informing you, that a little of the seed taken from the cotton grown at Phoolbariah has vegetated well, although only lately planted, and in the same

land as that on which the other seed planted failed; this I trust will prove to Government that the present failure cannot be attributed either to the soil or climate of this district.

4. I have the honor of enclosing you with this report an account of the sundry sums of money paid away out of the three hundred (300) Rs. granted me by you for the use of the Government Ryutee cotton cultivation.

(Signed) J. O. Price.

Dacca, 31st January, 1845.

Sir,—I have the honor to submit to you, for the information of His Excellency the Governor General of India, the monthly report of my proceedings for the month of February.

2. Early in this month I left Dacca and proceeded up the Luckia to meet you for the purpose of pointing out to you several places which I had the honor in my former reports to Government, to recommend as localities likely to suit the growth of foreign cotton, and on the 6th instant, I had the honor of meeting you at Bemrya, at which place we examined the land that I had reported favourably of to Government at that place; from thence on the following day after crossing the river Banar, we proceeded by land to Toke, also inspecting the lands in that district of the country, and on the succeeding morning (particularly,) examined the locality of Toke, of which I also had the honor of reporting to Government favourably of; on leaving that place I accompanied you further into the interior of that district, and on the following day accompanied you to examine the district of Capassia on the left side of the Banar, and from thence as far down the Luckia as Echdallah, at which place I remained a day and inspected that neighbourhood, after which

I returned to Dacca for the purpose of taking into consideration with you the advantages and disadvantages of the several places we had been to examine.

3. On my return to Dacca, finding that I had still spare time to enable me to examine Capassia on the right side of the river Banar, and particularly so as the coolies had not yet arrived, I again proceeded up the Luckia for that purpose, and after closely examining that part of Capassia, I am of opinion that the locality of Luttipore is particularly suited for May and June planting. I also beg leave to state, that I am of opinion 125 beegahs of land will be sufficient to commence the establishment of the experimental farm with, at that place, and particularly so as Government has approved of the establishing of two farms, namely, one in the Northern, and the other in the Southern part of this district; this will leave the same quantity of land out of the 250 beegahs named by Government for the establishment of the Southern farm, and should it be considered necessary hereafter to extend the farms, land can then be procured for that purpose.

4. The farming implements already received from Government will be sufficient I expect for both farms, and particularly so as the remainder of those at Rungpore are to be sent to this place, which will likely be here previous to our doing any thing on the Southern farm, as the planting season will not commence on it before October.

(Signed) J. O. Price.

Dacca, 28th February, 1845.

Sir,—I have the honor to submit to you, for the information of His Excellency the Governor General of India, the monthly report of my proceedings for the month of March.

2. Early in this month I proceeded to Phoolbariah for the purpose of making arrangements with a native at that place, who had offered to supply me with some cotton seed of the biennial kind, grown in Mymensing, and of which I reported to Government having seen at Dainroy, and also in Capassia, when bearing in the month of January 1844; but in so small a quantity, that I could not depend on it for seed. In this I regret I did not succeed, the native being absent from home; but I will take care to procure some of it in time for the planting season, however small the quantity may be for the first planting.

3. On my returning to Dacca I went on the Burrampooter also, for the purpose of securing some of the best native cotton seed in that district, but of the annual kind, which some of the natives have engaged to preserve for me when picking their crop in the month of May.

4. I next proceeded up the Luckia to Lukipore, with the intention of marking out the lines of the land at that place on which I intended establishing the farm, but finding that I could not get a sufficient quantity of land at any one place without a great portion of it being jungle, and taking into consideration that the coolies had not yet arrived, and the season so far advanced, I did not think it advisable to settle the farm at that place, and consequently give the preference to the land in the district of Toke, to which place you accompanied me in February for the purpose of inspecting.

5. On my return to Dacca, I found that R. E. Cunliffe, Esq., Collector, had sent a Mohurrer to me to lay down the lines of the farm and measure the land; but having not seen him on my way down the Luckia, I again proceeded to Toke, and pointed out to him the boundaries of the land I had selected, and on my return visited Bermya Bazar, and made arrangements for posts, &c. for the coolies' huts, on

my arriving at Dacca; I also visited Meirpoor for the purpose of engaging choppers for the same.

(Signed) J. O. Price.

Dacca, 31st March, 1845.

Sir,—I have the honor to submit to you, for the information of His Excellency the Governor General of India, the monthly report of my proceedings for the month of April.

2. On the 4th instant I proceeded to Meirpoor, and after giving advances for coolies' choppers, I returned to Dacca on the following day, and proceeded on my way to Toke for the purpose of visiting the several bazars in that district, so as to be able to purchase small posts, thatch, &c. &c. for the erection of the coolies' huts at as reasonable a rate as possible, but as those articles, and particularly that of grass, can only be got at this season of the year in comparatively small quantities at any one place, it will take a part of next month to complete what is required.

3. It is with much regret that I refer to the Dh[illegible]gurs applied for in January not having yet arrived, and the likelihood of its being some time before they do so, not that I ever intended planting to any extent in May, as in my opinion earlier than the 20th of June would be too soon for a general crop, as the bowls would open before the termination of the rains, and if not entirely destroy, the bowls would injure very much the colour and staple of the cotton, and I am of opinion at present that the month of July will likely prove the best month for planting, as cotton seed planted at that time should commence bearing early in November, and consequently would have the advantage of the dry season of the year for picking the cotton in; however, it is my intention, if I can procure laborers, to plant less or more in every month up to October on the Toke farm; but what I feel

most, the want of the Dhangurs for at present, is for draining and ridging the land, so as to prepare it for seed, without which a *good* crop *of* cotton *can never* be *expected in* so level a district as this is, and subject to such heavy rains as it is at this season of the year: [this precaution will of course not be required on the farm to the Southward of the district, as the seed will be planted in the early part of the dry season] but besides the above, their services are much required at present to make fences round the farm, and also to assist in erecting their own huts.

(Signed) J. O. PRICE.

Dacca, 30th April, 1845.

THE JOURNAL

OF THE

Agricultural & Horticultural Society

OF

INDIA.

Report on the Cultivation and Manufacture of Tea in Kemaon and Gurhwal. By WILLIAM JAMESON, ESQ. *Superintendent Botanical Gardens, North-Western Provinces.*

From J. THORNTON, ESQ., *Secretary to Government N. W. Provinces, to the Secretary to the Agricultural and Horticultural Society, Calcutta.*

General Dept. N. W. P.

SIR,—I am directed by the Honorable the Lieutenant Governor, N. W. Provinces, to place at the disposal of the Agricultural and Horticultural Society, for publication in their Journal, the accompanying copy of a Report from Dr. Jameson, Superintendent of the Government Garden, Saharunpore, on the Tea experiment now being carried on in Kemaon and Gurhwal.

I have, &c.
J. THORNTON,
Secy. to Govt. N. W. P.

Agra, 3rd September, 1845.

1. II. *Report on the Cultivation and Manufacture of Tea in Kemaon and Gurhwal.*

Part I. *Kemaon.*—The first part of this Report will be confined to a statement on the culture and manufacture of Tea in the province of Kemaon, and, in order to shew clearly what has been done, shall be treated as follows: 1st. Progress made in the extension of the Tea nurseries and the increase of the number of the Tea plants; 2dly. Quantity of Tea manufactured; 3dly. Expenditure, and probable income to be derived from the experiment as now conducted; 4thly. Estimate shewing the rate the Tea could be cultivated on an extensive scale, and the advantages attending such a speculation.

2. Part II. *Gurhwal.*—1st. Nurseries in Gurhwal, and numbers of plants in each; 2dly. On the manufacture of Tea in Deyra Dhoon; 3dly. Concluding remarks.

3. 1st. Progress made in the extension of the Tea nurseries, and the increase of the number of Tea plants.

4. Since last season the number of acres of land that have been planted with young Tea plants, amounts to, in

Russiah,	21	Acres.
Kooa Sar,	24½	
Anoo,	4½	
Kupeena,	1	
Hawalbaugh,	5	
Chullar,	20	
Total,	76	

And the number of plants planted in each, amounts to, in

Russiah,	19,000
Kooa Sar,	31,512
Anoo,	7,923
Chullar,	30,866
Kupeena,	2,800
Lutchmaissur,	2,000
Total,	94,101

5. We have thus therefore planted all the ground, or nearly so, allotted to us by Mr. Senior Assistant Commissioner Batten, with the exception of a small space in the Russiah plantation, which will contain a few thousand additional plants. In September and November last upwards of four lacs of seeds, the produce of the nurseries, were sown, and of these 167,000 have already germinated, and they are still daily germinating, so that this season there will be sufficient numbers of young plants to cover 80 or 90 acres, and we can with our present establishment bring a large quantity of this land into cultivation. We shall therefore add 10 acres to Russiah, 3 to Bhurtpore, and 10 to Kooa Sar and Anoo. To the nurseries in the neighbourhood of Almorah we cannot add any additional ground, there being none procurable; we trust, however, to be able to establish a new nursery, a few miles to the westward of Hawalbaugh, of 26 acres, which will nearly bring our establishment to their full working condition, as I consider 3 acres of land as much as a single mallee is capable of doing justice to: moreover it will always be necessary to keep a large establishment in the nurseries of Lutchmaissur, Bhurtpore, and Kupeena, as from these, the necessary supplies of seeds (the original Chinese plants being there deposited) are principally obtained. The additions therefore contemplated this season, will amount to 47 acres. We append the following short account of each of the nurseries, in order that some idea may be formed of the nature of the land, and, at the same time, it will shew where extensions can be made.

6. *Nurseries—Russiah.*—Elevated 4200 feet above the level of the sea, consists of 49 acres, and is situated in a valley in the neighbourhood of the new Kouchiah lake, surrounded on all sides, the S. W. excepted, by mountains that rise to a height of several hundred feet. It admits of considerable extension. This nursery consists of a series of terraces which have a considerable inclination, and are

exposed to the S. W. The soil is light, of a silico-aluminous nature, and abounding in small pieces of clay slate, the subjacent rock. The supply of water is good, being procured from a small stream that forms its S. E. boundary.

7. *Bhurtpore.*—Elevated about 4400 feet, is situated on the acclivity of a small hill formed by the intrusion of a body of trap, amongst the Silurian rocks, which separates it from the Bheemtal lake. It consists of three acres, and is formed of terraces, which are highly inclined and very abrupt, and exposed to the North. The soil is of a similar nature to that of Russiah, and abounding with small masses of trap and clay slate. It extends to the small lake of Anoo Sar, which separates it from the Kooa Sar nursery. A portion of the intervening ground now lying waste, and consisting of about three acres, is being brought into cultivation. The supply of water is good.

8. *Kooa Sar.*—Elevated about 4200 feet, consists of 24½ acres, and is situated in the valley of that name. It admits of considerable extension, and the supply of water from a small stream, which has its source on the northern or upper side of the valley, is considerable. The land has a considerable inclination, with a southern exposure. The soil is similar to that of Bhurtpore and Russiah.

9. *Anoo.*—This nursery consisting of 4½ acres, is situated in the same valley as the last, and is only separated from it by the bed of a small stream that drains it during the rains. It too is capable of much further extension; but as the supply of water during the hot weather is precarious, it will not at present be extended. The soil, aspect, &c. are the same as Kooa Sar. Such are the nurseries that are first met with in the Chakata district on ascending the hills by the Bhamouree ghaut, and distant about ten miles from the plains.

10. *Kupeena.*—Elevated about 5200 feet, consists of about four acres of land, and is situated on the acclivity of the

Almorah valley; the terraces are highly inclined, with a southern aspect. The supply of water is good.

11. *Lutchmaissur.*—Adjoins Kupeena, and is about the same extent; has a similar exposure and elevation, and the terraces are equally abrupt. The soil of both is very light, being formed from the decomposition of the subjacent rocks, (clay slate and quartz rock,) intermixed with a small quantity of decomposed vegetable matter. The supply too of water is good. Neither admit of further extension.

12. *Hawalbaugh and Chullar.*—These two nurseries, situated in the valley of Hawalbaugh, and elevated about 3900 feet, adjoin each other; in the upper part the soil consists in some places of stiff reddish clay, the colour being caused by an admixture of peroxide of iron; the remainder, however, is in character very similar to the other nurseries described, consisting of terraces which extend to the bed of the Cosillah. The subjacent rock is clay slate, which is almost entirely composed of mica. All the rocks in the neighbourhood of Almorah and Hawalbaugh are metamorphic, caused by the intension of granite, which in many places is met with outcropping. This is well seen on the Almorah road leading to the plains before descending the Ghaut to cross the suspension bridge over the Cosillah.

Such is a short account of the different Tea nurseries in Kemaon. In their characters all appear to be very similar to each other, and all well supplied with water (with one exception,) which is essential to the welfare of the Tea plant. The range too of elevation is considerable, viz. from 3500 to 5200 feet above the level of the sea. Snow falls seldom in the Chakata district, but frequently to the depth of several inches at Almorah. The frosts too are frequently very severe at Hawalbaugh in December and January.

13. The following table shews the date of the formation of each nursery, the number of plants, and their ages.

Names of Nurseries	When established.	Number of Plants						1 Year now transplanting.	Seedlings which will be ready for transplanting in Sept next	Total.
		9 Years.	6 Years.	5 Years.	4 Years	3 Years.	2 Years			
Bhurtpore, ...	1835-6	268	,,	647	295	355	1,368	368	2,000	5,301
Lutchmaissur, ...	1835-6	260	1,000	1,300	,	,,	4,760	16 040	1,020	24,380
Kupeena, ...	1841-2	,,	,,	,,	1,700	5,600	3,480	30	570	11,380
Russiah	1841 2*	,,	,,	,,	15,320	1,267	9,268	10 925	20,310	57,090
Kooa Sar, ...	1844		,,	,,	,	,,	28,712	2,800	1,35,000	1,60,512
Hawalbaugh, ...	1843	,,	,,	,,	,,	6,607	5,063	2,000	1,000	14,670
Chullar, ...	1844	,,	,	,,	,,	,,	11,366	2,500	7,000	20,866
Anoo, ...	1844	,,	,,	,	,	,,	7,923	,,	,,	7,923
Total	,,	528	1,000	1,947	17,315	13 829	71,940	34,663	1 66,900	3,08,122

---

* Russiah was first established in 1841 2 and the position being an advantageous one, has annually been increased.

14. 2nd. *Quantity of Tea manufactured.*—The quantity of Tea manufactured has steadily increased, amounting last season to lbs. 375, being an increase of lbs. 185 on the former season. The following table will shew the progress made in making Tea, and the nurseries from whence leaves have been derived.

Names of Nurseries.	No. of acres.	Tea yielded in 1842.		Tea yielded in 1843.		Tea yielded in 1844.		Total.		Remarks.
		lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.	
KEMAON.										
Lutchmaissur, ..	3	16	..	95	7½	166	2	277	9½	
Kupeena, ...	4	5	..	37	4½	52	15	95	3½	
Bhurtpore, ...	3	4	12	39	15½	59	14	104	9½	
Russiah, ...	49	..	..	18	6	91	13	110	3	
Kooa Sar, ..	29	..	..	..	..	..	..	..	..	
Anoo, ...		..	..	..	..	..	..	..	..	
Hawalbaugh,	30	..	..	..	..	3	9	3	9	
Chullar, ...		..	..	..	..	..	..	..	..	
Grand Total, ..	118	25	12	191	1½	374*	5	591	2½	

This table, though limited, is highly interesting and important; as showing that from a single nursery consisting of little more than 3 acres of land in which there were only 2,560 plants yielding leaves, the remainder upwards of 4,760 being too young, the produce received was equal to two maunds and two lbs. The first year's return of Tea is no criterion to judge of the progressive increase, as the Chinamen were only once or twice engaged in making Tea. But by the considerable increase of the 3rd year's produce over that of the 2nd, and from the table too it will be perceived, that in the 2nd year only some of the shrubs in two of the nurseries (Lutchmaissur and Kupeena) were giving their full return of leaves, some idea may be formed of the quantity that may ultimately be expected. This too is apparent from the produce lbs. 91, 13, 0 of Russiah nursery, which was only established in 1841-2. The Tea plant does not yield leaves until the 3rd year; no doubt some, more forward than others, do, but I think that pulling leaves when the plants are so young is detrimental to their rapid growth. From the 3rd year it gradually increases its produce until the 8th or 10th, at which time it attains its maximum. From the number of plants now in cultivation the returns of Tea yielded will annually rapidly increase. From the data yielded by Lutchmaissur, we may consider that a minimum return per acre when all the plants come into full bearing, may be estimated at one pucka maund, which being sold at a rate of Rs. 3[*] per seer will yield Rs. 120. To each mallee on Rs. 4 per mensem, we ascribe the charge of three acres of land. A single acre therefore will cost Rs. 16 × land rent Rs. 3=19 per annum, and thus a clear profit of Rs. 101 to cover the expense of Tea making, &c. will be left.

---

* In addition to the 374 lbs. of Tea manufactured in 1844, there were lbs. 60 of very coarse Tea. This is probably too coarse for marketable purposes, and has therefore not been noticed.

Names of Nurseries.	Present under cultivation.	Additions.	Total.
	Acres.	Acres.	Acres.
Russiah, .. .	49	10	59
Bhurtpore, .	3	3	6
Kooa Sar, .	29	10	39
Anoo, .. .			
Lutchmaissur,	3		3
Kupeena, ...	4		4
Hawalbaugh, ...	30	24	54
Chullar, ...			
Total, ...	118	47	165

The number of acres now in cultivation in Kemaon, as per table, may be estimated at 118; and which, I trust, will be raised this season to 165, which will yield, when all the plants come into full bearing as estimated, 165 maunds of Tea. This being sold at Rs. 3 per seer, will realize Rs. 21,600. The present expenditure in Kemaon is as follows:

---

[*] At the sale of Kemaon Tea that took place at Almorah on the 12th ultimo, the average amount realized per seer was Rs. 4-8. The maximum price for Pouchong was Rs. 5-1, minimum Rs. 4-8. For Bohea the maximum Rs. 4-8, minimum Rs. 3-2. We have, however, estimated the price at Rs. 3, a sum which will always be obtained for the Almorah Tea. The above prices are high, and may have originated in the small quantity of Tea sold, viz. 173 seers.

TEA CULTIVATION.			
Overseer,	Rs. 100 per mensem	= Rs. 1,200	
Mallees,	,, 247 ,,	= ,, 2,964	
Contingencies,	,, 60 ,,	= ,, 720	
			4,884 0 0
TEA MAKING AND PACKING.			
10 Chinese Tea makers,	,, 331 4 0 ,,	= ,, 3,975	
2 Ditto Tea box-makers,	,, 64 4 0 ,,	= ,, 771	
4 Sawyers,	,, 24 0 0 ,,	= ,, 288	
			5,034 0 0
LAND RENT.			
Present rent per annum,		Rs.* 247 5 8	
Rent of additional 50 acres, at Rs. 3 per acre,		,, 150 0 0	
			397 5 8
		Total Expenditure, Rs...	10,315 5 8
		Omitted repairs, &c. per annum,	280 0 0
		Total Rs...	10,595 5 8
		Amount realized by the sale of Tea,	21,600 0 0
		Balance, Rs...	11,004 10 4

15. This balance though good, is very far short of the amount that would be realized were the establishments better adjusted. Thus the present Tea manufacturing establishment with a small additional assistance in picking, &c. is capable of making at the rate of from 20 to 30 maunds daily, or of manufacturing Tea leaves procured from six thousand acres of land. The Nursery department (though on a sufficient scale to carry out the views of Government, viz. to prove that Tea can be advantageously cultivated, its good qualities having already been ascertained,) is therefore on a small scale compared to the former, and as long as this continues, the returns will always be very far short of what they ought to be.

---

* Some of the land now under cultivation is Government land, and therefore free of rent.

16. The following is a calculation shewing the rate at which six thousand acres of land can be cultivated, the expense of *carriage, &c. and the return.*

	Each per Mon.	per Mon.	per Annum.	
CULTIVATION OF TEA.				
2 Overseers, ...	Rs. 100 0 0	200 0 0	2,400 0 0	
2 Assistant ditto, ...	,, 60 0 0	120 0 0	1,440 0 0	
8 Moonshees, ...	,, 10 0 0	80 0 0	960 0 0	
30 Chowdrees, ...	,, 8 0 0	240 0 0	2,880 0 0	
30 Assistant ditto, ...	,, 7 0 0	210 0 0	2,520 0 0	
1600 Mallees, ...	,, 4 0 0	6,400 0 0	76,800 0 0	
				87,000 0 0
MAKING TEA.				
10 Chinese Tea manufacturers,	,, 33 2 0	331 4 0	.. .. ..	3,975 0 0
PACKING TEA.				
2 Chinese Tea box-makers,..	,, 33 0	66 4 0	795 0 0	
1 Chowdree Carpenter, ..	,, 0 0 0	10 0 0	120 0 0	
1 Assistant ditto, ...	,, 0 0 0	8 0 0	96 0 0	
12 Carpenters, ...	,, 6 0 0	72 0 0	864 0 0	
8 Sawyers, ...	,, 4 0 0	32 0 0	384 0 0	
				2,259 0 0
CARRIAGE.				
Carriage of 6,000 maunds of Tea to Bhamoree, at 1 R. per maund, ...			6,000 0 0	
Ditto 6,000 ditto of ditto to Ghurmuktissur Ghaut, at 25 maunds, to each 4-bullock hackery, it being 8 stages, at Rs. 1-8 per stage=Rs. 12, and of these 240 will be required, 240 × 12=			2,880 0 0	
Hire of eleven 600-maund Boats to transport the Tea to Calcutta, Rs. 220 each, Rs. 220 × 11, ...			2,420 0 0	
EXTRAORDINARY CONTINGENT EXPENSES.				
Wood for boxes, repairs, additional coolies, &c.		600 0 0	7,200 0 0	
LAND RENT.				
Land rent of 6,000 acres, at Rs. 3 per annum, ...			18,000 0 0	
				36,500 0
Total Expenditure, Rs...			..	.. 1,29,734 0
To value of 6,000 maunds of Tea, or 2,40,000 seers, at Rs. 2 per seer, ...			..	.. 4,80,000 0
Balance, Rs.			..	.. 3,50,266 0
Or say that the Tea is sold at Rs. 1-8 per seer, 2,40,000 × 1-8, ...			3,60,000 0 0	
Expenditure, Rs...			1,29,734 0 0	
Balance, Rs...			2,30,266 0 0	

17. This estimate is as accurately calculated as our data will admit. But the establishment and contingencies are estimated on the most liberal scale, and therefore I do not consider the return over-rated. The first object of attention in this estimate is, the number of men required to work in the plantations, and the question arises, is such a large body of men procurable? From the information that I have procured in passing through Kemaon and Gurhwal, I believe that four or five thousand men, if necessary, could be obtained. Such too is the opinion of Messrs. Batten, Ramsay, and Huddlestone, all intimately acquainted with the resources of the provinces over which they preside. Moreover, though I have put it down in the estimate, I do not consider that it will be necessary for the parties who manufacture Tea to keep up nurseries on their own account. On the other hand, I am confident, that natives by encouragement, and by making advances, will be induced to undertake the cultivation of the plant; a certain sum per seer for kutcha leaves being paid to them at the manufactory, and from the vast return they can be paid in a liberal manner. Kutcha leaves yield one-fourth their quantity of pucka Tea. A zemindar pays his jumma to Government at the rate of 12 annas per bissa.* The following table, for which I am indebted to the kindness of Capt. Ramsay and Capt. Huddlestone, will shew what profits are realized by the cultivation of different kinds of grains, and the advantages that must result by cultivating Tea. Moreover the very circumstance that the cultivation of Tea, in addition to vast pecuniary advantages, is attended with but comparatively light labour, would be another inducement to make the natives undertake the cultivation of the plant. If, therefore, this system could be generally established, a sum of upwards of 1,01,000 rupees, placed in the estimate for mallees and land rent, would be

---

* A bissa is about 20 yards short of an English acre.

at the party's disposal to carry out the above measure. The advantages, too, of throwing into this poor country such a sum of money would be great for the agricultural population.

18. In the table comprehending the purgunnahs of Almorah Kalli Kemaon, Shore Kemaon, and the province of Gurhwal the only grains it will be perceived that give a good return are wheat, barley, and rice; but the low rate that they bring varying from 5 annas to 1 rupee per maund, and in districts distant from Almorah, and the other large towns, there is no market; so that the zemindars in order to get rid o their produce, sometimes have to carry it fifty, one hundred or more miles, and for this receive less than they would have had they been employed merely as a coolie in carrying a load.* On the other hand, for a maund of kutcha Tea leaves, they would receive at the manufactory five or six times the amount procured elsewhere for any other produce, which would remunerate them well for their labour even though the leaves had to be brought from a considerable distance. The picking too of leaves could be performed by the women and children of the different villages and thus add to their profits.

---

* The average rate of coolie hire varies from 2 to 4 annas per stage of 10 12 miles.

Table shewing the rate of produce yielded by different kinds of Grains in the purgunnahs of Kemaon and Gurhwal.

ALMORAH.

Rubbee Crops sown in the Cold Season.

Names of Crops	When sown.	When reaped.	Seers of seeds per Bissa.	Maunds of produce per Bissa of superior land.	Maunds of produce per Bissa of inferior land.	Maunds of produce per Bissa of middling land.	Bazar rate per maund.	Remarks.
Wheat, ... (Triticum vulgare.)	Oct. & Nov.	April.	* 20 nallees.	15 maunds.	5 maunds.	10 maunds.	1 Rupee.	* A nallee is equal to about two seers of 83 Furruckabad sicca weight: it varies in weight in some districts.
Barley, ... (Hordeum hexastichon.)	Sept. & Oct	March	30 ,,	30 ,,	10 ,,	20 ,,	8 As.	
Mussoor, ... (Ervum hirsutum.)	August	April.	5 ,,	8 ,,	3 ,,	5 ,,	1 Rupee	
Khurrif Crops sown in the Rainy Season.								
Dhan, ... (Oriza sativa.)	March.	Sept.	30 nalees.	40 maunds.	14 maunds	17 maunds.	12 As.	
Mandooa, ... (Eleusine coracana.)	May.	Oct.	8 ,,	20 ,,	7 ,,	14 ,,	12 ,,	
Jhangura, ... (Panicum frumentæcum.)	April.	Sept.	10 ,,	20 ,,	7 ,,	14 ,,	8 ,,	
Bhut, ... (Phaseolus.)	May.	Oct.	24 ,,	15 ,,	5 ,,	10 ,,	9 ,,	
Oorud, ... (Phaseolus radiatus.)	June.	Do.	20 ,,	8 ,,	3 ,,	5 ,,	R. 1-1	
Teel, ... (Sesamum prostatum.)	May.	Sept.	4 ,,	6 ,,	2 ,,	4 ,,	,, 1-8	
Cheena, ... (Panicum miliaceum.)	Do.	Aug.	5 ,,	10 ,,	3 ,,	6 ,,	10 As.	

Table shewing the rate of produce yielded by different kinds of Grains in the purgunnahs of Kemaon and Gurhwal.

SHORE KEMAON.

Rubbee Crops sown in the Cold Season

Names of Crops	When sown	When reaped	Seers of seeds per Bissa	Maunds of produce per Bissa of superior land	Maunds of produce per Bissa of inferior land	Maunds of produce per Bissa of middling land	Bazar rate per maund	Remarks.
Wheat . . . (Triticum vulgare)	Oct & Nov	May.	14 seers	1½ maunds	30 seers.	1 maund.	1 Rupee	
Barley .. .. . (Hordeum hexastichon)	Ditto	Ditto.	20 ,	8 ,	1 maund.	1½ ,	1 Anna	
Mussoor . .. .. (Ervum hirsutum)	Sept & Oct	April	10 ,	1 ,,	20 seers.	30 seers	12 As	
Teel, ... (Sesamum prostatum)	Aug & Sept	Ditto	2½ ,	20 seers	10 ,,	15 ,,	R 1-1	

Khurrif Crops sown in the Rainy Season

Names of Crops	When sown	When reaped	Seers of seeds per Bissa	Maunds of produce per Bissa of superior land	Maunds of produce per Bissa of inferior land	Maunds of produce per Bissa of middling land	Bazar rate per maund	Remarks.
Dhan on hills .. .. (Oriza sativa.)	April.	Sept & Oct	20 seers	8 maunds.	1 maund.	1½ maunds	5 As	
Ditto in vallies, .. (Ditto.)	May	Oct & Nov	10 ,	9 ,	1 ,,	1½ ,,	5 ,,	
Ditto Basmoti in ditto, .. (Ditto)	April	Ditto.	10 ,	8	..	....	8 ,	
Ditto ditto on hills, (Ditto)	Ditto	Ditto	20 ,	2 ,,	30 seers.	1 maund	8 ,,	
Mandooa, . .. (Eleusine coracana)	May	Ditto.	4 ,	2½ ,	30 ,	1 md 1 sr.	1 Anna	

ine

Sh K

opı Rı

Names of Crops.	When sown.	When reap-ed.	Seers of seeds per Bissa.	Maunds of produce per Bissa of superior land.	Maunds of produce per Bissa of inferior land.	Maunds of produce per Bissa of middling land.	Ba rate mau
Oorud, ... (Phaseolus radiatus.)	June.	Oct. & Nov.	8 seers.	1 maund.	20 seers.	[illegible]	1 Rup
Bhut, ... (Phaseolus)	Ditto.	Ditto.	10 ,,	1 md. 1 seer.	32 ,,	[illegible]	11 As
Teel, ... (Sesamum prostatum.)	Ditto.	Sept. & Oct.	1 ,,	20 seers.	8 ..		R. 1-]

Ke aon.

Crops *ıg th Cold Sea*

W
(T

&

m .ast

am.

ocalit
f·om 14
40 seers
lı cool d
f·om 20
30 seers

var
itie
3 rs
lı l d
4
3

Table sh of produ ielded by different kinds of Grains in the pa of K

KALLI KEMAON.—*(Continued.)*

Khurrif Crops sown in the Rainy Season.

Names Cro	When sown.	When reaped.	ers of ds per issa.	Maunds of produce per Bissa of superior land.	Maunds of produce per Bissa of inferior land.	Maunds of produce per Bissa of middling land.	Bazar rate per maund.	Remarks.
Dhan, .. (Oriza sativ	y & J e.	Oct. & Nov.	eers.	17 to 18 mds.	4 to 5 mds.	10 to 12 mds.	10 As	
Ditto Basm (Ditto.	May.	November.	2 ,,	Ditto.	Ditto.	Ditto.	R. 1-1	
Mundo ι, (Eleus e c	June.	(Ditto and another kind in September.)	1 ,,	14 to 15 mds.	7 to 8 mds.	10 to 12 mds.	10 As.	
Oord- .. (Phase lus radi us.	July.	November.	1 ,,	6 maunds.	3 maunds.	5 maunds.	R. 1-10	
Bhut, . (Phase lus)	Ditt	Ditto.	1 ,,	7 ,,	1½ ,,	4 to 5 mds.	R. 1-8	
Teel, . (Se m rostal	Jun	O	,,	4 ,,	1 ,,	2 to 3 ,,	R. 1-12	

C

Crops.	When sown.	When reaped.	Seers seeds p Bisse	Maunds of produce in a good year.	Maunds of produce in a bad year.	Average Crop.	Nirick	Remarks.
Wheat, (Triticum.)	Oct. & Nov.	April & May.	15 to 20 s	5 maunds.	2 maunds.	3 maunds.	4 As.	Situation, aspect, and nature of soil in a hill country so much determine the quantity of s ed to be sown and amount of produce, that but very distant approximation to the truth can be given; not only different purgunnahs and puttas widely differ, but even almost every village in each putta woul be found to vary equ lly.
Barley, (Hordeum	Ditto.	Ditto.	20 to 25	6 ,,	2 ,,	3½ ,,	3 ,,	
Teel, .. (Sesamum itat	September.	Mar. & April.	2 to 3	1 ,,	¼ ,,	¾ ,,	R. 1-4	
Mussoor, (Ervum hi im.	Oct. & Nov.	April.	12	2 ,,	½ ,,	1¼ ,,	1 R.	
Peas, .. (Pisum.)	Ditto.	Ditto.	16	4 ,,	1 ,,	3 ,,	1 ,,	

Kh if Crops.

Dhan .. (Oriza ıativa.)	r. & May.	Sept. & Oct.	20 to 40	8 to 12 m				Every thing depends on situation, aspect, and nature of soil as to quantity of seed, amount of produce, so that but a very faint approximation to the exact state of the case can be give
Mandooa, .. (Eleusine corac	May.	Oct. & Nov.	4 to 7	8 maunds				
Jhangoora, .. (Panicum frumenta	March.	Sept. & Oct.	2 to 3	1 to 8 m			3 ,,	
Oorud, .. (Phaseolus radiatus.	July.	November.	8 to 1(	3			1 R.	
Bhut, ... (Phaseolus.)	Ditto.	Ditto.	Dit	1			4 A	

Gu 'A

Khı rrif Crops. —(ıtinu

Crops.	Wl	Wl	Seers seedr - Bil	Maunds of produce in a good y	Maunds o produce in bad year.	Aver Crop	Ni :k.	Rem
Teel, ... (Sesamum prost al	May & J	Septembe	2	1				
Bhang, .. (Cannabis sativ	June.	Novembe	6	3				
Cheena, ... (Panicum miliac m.	May.	August.	3 to	2			4 A	
Phaphur, ... (Polygonum.)		Sept. & O	2 to					
Cotton, .. (Gossipium ann		Oct. & Nov						

19. With reference to carriage, I have placed this item in the estimate more for the purpose of shewing that advantages would attend the transportation of the Tea even to the mercantile capital of India. Not that I deem it necessary. On the other hand, the letters of Messrs. Batten and Huddlestone* shew, that in our hill provinces a considerable outlet for the produce of the manufactories would be obtained. To Capt. Ramsay, I am indebted for the following valuable observations made by him last season, when on a tour of duty to the British frontier, on the Tea trade of Bhote :—" From enquiries the Tea trade in Bhote appears to be carried on in two ways : 1st, bricks of Tea, in weight about three seers each, and varying from that to 3½ seers, are imported into Bhote to the value of a lac of Rupees by the Lhassa Government. This is called *Jemy Chemy Pan*, or the Sirkaree trade. It is brought on jooboos in July, August and September, about 30,000 to 40,000 Rs. worth is divided amongst the Bhote Tokdars. Each is required to pay 10 Rs. per cake, and he adopts the same system towards his underlings, or Assamees, for getting rid of whatever may be debited to him. One Gomashta has charge of all to Manaserawar, where the respective divisions are made and despatched to Guntokh, Tukla-kal Dassoo, &c. and a Gomashta sent with each batch. The remaining 60,000 or 70,000 Rs.

---

* The following extract shews Captain Huddlestone's opinion as given in Para. 2nd of his letter to Mr. Lushington, dated 21st April, 1844: "Tea would become, no doubt, of general use to the middling and better classes, whilst it would be used by the poorer as a medicine if it were cheaper, and thus greater quantities would be imported; but the price, 3 or 4 Rs. per seer, puts it quite out of the power of the people to indulge in so expensive a luxury; but perhaps in the course of some years hence, as the Government Tea nurseries increase, the zemindars may be induced to take up the cultivation of the Tea plant on their own account, thus proving a source of profit to themselves, as well as an easy means of supplying leaves to the Government manufactories; for many spots of the large tracts of, now, uncultivated waste in this province might be found, no doubt, well adapted to the growth and propagation of the Tea plant."

worth is sent to Ladakh, where the Lhassa Government set up a regular shop. The finest Tea is sent to Ladakh. The Chinese name of the cake is 'Doom,' and the mode of selling it by arbitrary settlement on the Tokdars is called 'Poogar.' The other trade is Khoosh-khurreed, and in value amounts to one lac of Rupees, but the quantity thus imported is double that of the Government trade. Each cake brought in this way sells for about 5 Rupees. The Lhassa people part with it to our Bhotias for cloth, sugar, &c. to the value of 40,000 or 50,000 Rupees, and they retail it at Gurtokh, &c. to the Hoondesees for cash. The remainder is disposed of to the Hoondes' people. Very little Green Tea is brought into Bhote, and what is brought is considered double the value of the Black, and all sent to Ladakh. Our Bhotias find little sale for the Lhassa Tea on our side, and do not import more than 100 cakes; a little of this they sell at Bagessur. The rest they consume themselves. For the Tea received the Bhotias give in value goods to the amount of Rs. 4 on a cake, and re-sell it for 5 to 6 Rs. The Bhotias assemble annually at Moonshera to transact business in May." That the Kemaon Tea would be appreciated too there, and supersede that at present consumed by the inhabitants I doubt not, judging from the samples of Tea now used, that I have seen. Mr. Bayley, C. S., took some of the Kemaon Tea to Kunnowur, and has favoured me with the following observations: "The Tea that I took to Kunnowur from Almorah was a common Black Tea, and had been partially damaged. I shewed it to several people, principally at Hango and Chango on the S.W. branch of the Sutlege, and asked them what they thought of it. They said, on tasting, that 'it was much better than their own,' and eagerly asked for presents of it. I then asked what price such Tea might fetch at the market they frequented in the Chinese dominions; and they answered, that they could not tell as they had never seen such for sale, but that for the coarse Tea they paid usually one rupee per seer." These men traded principally with Chunovotee and Ladakh. Moreover, as remarked in a former communication, in Upper India a large market could be created was the price of Kemaon Tea moderate, the high rate of China Teas alone preventing the middling and poorer classes from purchasing them. The Commissariat too might be supplied from this source, and thus a good Tea would always be available for European Corps.

20. With reference to land, such a tract of country as 6000 acres, could not easily be obtained in any one district in the hills, having all the requisites necessary for good Tea cultivation. From what we have stated in former reports it is shewn, that the Tea plant not only thrives well in Kemaon, but also in Gurhwal, as at Guddowlee, Koath, and Ramaserai in the mountainous tract of this province; Kaolagir in the Deyra Dhoon. We have thus the plant thriving over about 4° of latitude and about 3° of longitude. A manufactory could be established in addition to that at Hawalbaugh in the Chakata district, a 3rd at Paoree, and a 4th at Deyra,* provided that the Tea now manufacturing is proved to be of good quality, and a marketable article. But it is a great mistake to suppose, that the quantity of land available and adapted to Tea cultivation in the hills is small. The

---

* If the Deyra Dhoon Tea proves to be of good quality, a tract of 100,000 acres could easily be obtained for the cultivation of the Tea plant. In the Attica Grant in the Western Dhoon, there are 5500 acres of land now unappropriated, and well adapted for cultivation. In the Western Hopeton Grant there are 5500 acres, and in the Centre Hopeton Grant 3500. All this land is generally cleared, so as to admit an immediate cultivation. The Kutter Putter Canal, proposed to Government by the present able and talented Superintendent, Mr. Vansittart, to be made at an expense of Rs. 90,000, will bring into cultivation about 17,000 acres of unappropriated land, all or the greater part of which, is suited to the Tea plant. The Eastern Dhoon too, the greater part of it at present an uncleared jungle, presents an inexhaustible field for extending the growth of the plant as soon as all the land in the Western Dhoon has been appropriated.

province of Kemaon alone is calculated to contain 10,965* square miles, which is thus divided:

Snow, ...	$\frac{4}{15}$	2924 square miles.
Barren and incapable of cultivation,	$\frac{5}{15}$	3655 " "
Cultivated, ...	$\frac{3}{15}$	2193 " "
Uncultivated, ...	$\frac{3}{15}$	2193 " "

And that of Gurhwal of 9000 square miles. The province too of Sirmoor contains much land well adapted for Tea cultivation. This also applies to a large portion of the hilly country East of the Sutlege.

21. PART II. *Gurhwal.*—1st. *Nurseries.*—The nurseries in Gurhwal are four in number: namely, the Guddowlee nursery in the neighbourhood of Paoree, elevated about 5300 feet above the level of the sea. Koath in the Bhuddree valley, elevated about 5000. Ramsarai in the valley of that name, about the same height. In all these localities snow falls, and in the last mentioned nursery frequently to the depth of two to three feet, and lies for weeks: it is distant six long marches from Mussoorie. Kaolagir, situated in the magnificent valley of the Deyra Dhoon, elevated about 2200 feet.

22. The following statement will shew the number of plants in each:

Names of Nurseries.	Number of Acres.	Number of Plants.
Guddowlee, ...	3	5,000
Koath, ...	1	729
Ramsarai, ...	1	728
Kaolagir, ...	6	8,000
Total, ..	11	14,457

---

* See Trail, Trans. A. S. vol. xvi. page 138.

287 of the plants in Koath and 180 in Ramsarai, were imported from China, or rather raised from seed in Calcutta, sent from China by Dr. Gordon, and transmitted by orders of Government, some to Assam, and others to Gurhwal and Kemaon; and from these original plants all the others now growing in the different nurseries in Gurhwal and Kemaon, have originated.*

23. The additional land added to Kaolagir, has been planted.

---

24. 2nd. *Manufacture of Tea in Deyra Dhoon.*—In compliance with the orders of Government, there are now three Chinese engaged in manufacturing Tea at Deyra. A report on the quantity manufactured, with samples, will be transmitted to Government at the end of the season, in order that its quality may be tested in England, and by the Board of Commerce of Calcutta.

Sale of Tea.—A sale of Tea took place at Almorah on the 12th ultimo, and the amount realized per seer was highly satisfactory, averaging from Rs. 3-2 to Rs. 5-1 per seer. A second sale will take place at Almorah, in January next. The quantity sold was small, amounting to 173 seers. In addition to this, there are 8 boxes reserved for the Court of Directors, which will be sent to the Secretary to Government of Bengal for transmission to England in the ensuing cold weather. The invoice, as soon as the boxes are ready to despatch, or rather as soon as the weather will admit of it, will be sent to Agra.

3rd. *Concluding remarks.*—To recapitulate on the foregoing observations. We have given a short account of each nursery, stated the position and number of Tea plants; the quantity of Tea now yielded, and the amount that may ultimately be expected. We have also mentioned the number of acres that were brought into cultivation last season, and the number about to be added in the ensuing cold weather. We have shewn the extent to which the experiment ought to be carried by Government, in order to give a good remunerative return for the invested capital. We have pointed out by estimate the advantages that would result by cultivating the Tea plant on an extensive scale. We have speculated as to an available market, and finally we have shewn that there is abundance of land in the hills adapted to Tea cultivation. 2ndly. We have noticed shortly the nurseries in Gurhwal, and the number of plants in each, and the manufacture of Tea at Deyra. We have not however, we regret, been able to furnish the Manual called for by the Honorable the Lieutenant-Governor, giving an account of the Tea plant; its management, the soil best adapted for its growth, &c.; method of manufacturing different kinds of Tea, &c.; and this too owing to the green Tea implements indented for upwards of three years ago not having arrived at Hawalbaugh prior to our departure in June last, it being necessary for us to proceed to Deyra in order to establish the Tea manufacturers there. We shall again however return to Kemaon in September, and shall furnish the report called for (the implements having now reached,) as soon as we have seen, and thoroughly comprehended, the different processes of manufacturing Green Tea.

---

* In addition to the Tea plants mentioned as occurring in the different Government nurseries, numbers are also to be found in the gardens, &c. of Europeans and Natives, raised from seeds distributed by the Superintendent at my request.

26. With reference to teaching natives the mode of making Tea, the orders of the Honorable the Lieutenant-Governor have, I trust, been fully carried out. The Chinese manufacturers are always ready and willing to explain the different processes of making Tea to individuals desirous of becoming acquainted with them, and in addition there are natives belonging to the establishment expressly appointed for this purpose. A large and airy manufactory has been erected in Kemaon, to which every respectable person has

access during the time of making Tea. At Deyra the Tea is manufactured in the verandah of a large house in the new Bazar, and the facilities there presented for learning the process of making black Tea* are equally great.

(Signed) Wm. JAMESON,
Office of the Supdt. Bot. Gardens, *Supdt. Bot. Gardens.*
N. W. P.
Saharunpore, 31st July, 1845.

Botanical Observations in Upper Assam; being Part 6th of a Report on the Operations of the Assam Company in the Southern Division, to the month of February, 1843. *By* J. W. MASTERS, ESQ.

JAMES HUME, ESQ., *Honorary Secretary A. and H. Society of India.*

MY DEAR SIR,—I have the pleasure to forward for the Society's Journal, " Part 6th of a Report on the operations of the Assam Company in the Southern Division, to the month of February 1843." It consists entirely of Botanical observations, and is in fact little more than a list of dried plants forwarded to Sir W. J. Hooker, in June 1843. Since that time I have devoted myself entirely to an investigation of the Flora of Assam; as I did not reserve a single specimen of my former collections, I cannot now take advantage of these observations, but am obliged to examine every specimen as I gather it. I therefore send the paper to you in the state in which it was drawn-up for the Assam Company two years ago.

---

* To make Green Tea at Deyra would have incurred a considerable expense without any adequate return, owing to the small quantity of leaves now procurable; a large building, &c. being required for the purpose. It was not therefore deemed necessary to recommend such an outlay, as, if the leaves yield good Black Tea, they will, according to the Chinese manufacturers, afford good Green.

Parts 1 to 4 were published by the Local Board, and Part 5 in the "Calcutta Journal of Natural History," vol. 4.

I remain, &c.

Seebsagur, 8*th June*, 1845. J. W. MASTERS.

These observations are confined entirely to that part of the valley of Upper Assam, lying between N. latitude 26° 35′ and 27° 35′; and E. longitude 94° 30′, and 95° 30′, bounded on the East and South by the Naga Hills; on the West and North by the Brahmapootra river. Nearly all of the plants here enumerated have been collected between the Dessi and Booree Dihing rivers, at elevations not exceeding 650 feet above the level of the sea.

The mean annual temperature of this part of the valley is, (as shown by a Register kept at Nazera, a central situation,) 73°; mean temperature of the four hottest months 82°, and of the four coldest months 63°. There is rain in every month in the year, but the greater part falls between February and October, varying from about 80 to 100 inches annually. In the following synopsis are arranged a few of the plants which I have met with, and all that I have been enabled to arrange; the whole number I presume does not contain a fourth part of the Flora of this very small portion of the valley.

Exogenæ.

Ranunculaceæ.
Ranunculus, Linn.
1 —— sceleratus, Linn.
2 spicus.
Naravelia, D..C.
3 Zeylanica, D. C.
Clemates, Linn.
4 Goureana Roxb. ?
5 Smilacifolia, Wall.

The plants of this family scarce in this part of Assam. N. zeylanica is very common, and Major Jenkins informs me that C. smilacifolia is plentiful in Lower Assam; both of these are ornamental, climbing plants.

Papaveraceæ.

Papaver, Linn.
  6 Somniferum, Linn.
Fennaria, Linn.
  7 Parviflora, Linn.

The common white Poppy is very generally cultivated by the natives for the opium, or *Kani* which it yields; but I have not met with any species wild, nor have I seen any of those dreadful effects which are said to follow the smoking, or drinking of opium, although I have been three years in the country; I could not have been three hours in any seaport, or manufacturing town in Great Britain, without witnessing the ill effects of drinking spirituous liquors.

Nymphacaceæ.

Nymphaca, Linn.
  Nos. 8, 9 and 10, 3 species.
Nelumbium, Juss.
  11 and 12, the red and white varieties.

This family grows to great perfection in all the large tanks, especially the white Nelumbium, which produces flowers much more fragrant than any I have met with in Bengal.

Magnoliaceæ.

Michelia, Linn.
  13 Champaca, Linn.
  14 Oblonga, Wall. ?
  15 Species.
  16 Species.
Magnolia, Linn.
  17 Sphainocarpa ?
  18 Pumila, Andr.

These beautiful ornamental plants, producing exquisitely fragrant flowers, are common in the plains, and towards the foot of the hills, generally called *Sopa* by the natives. M. pumila has lately been introduced from the Botanic Garden.

Anonaceæ.

Uvaria, Linn.
  19 Bicolor, Roxb.
  20 Undulata, Roxb.
  21 Species.
Anona, Linn.
  22 Squamosa, Linn.

The Custard Apple has been several times brought to me from the villages, but I have seldom met with the tree except in gardens, where it has lately been introduced from Gowhatti or Bengal; I presume it is not a native of Upper Assam. The Uvareæ are common.

Dilleniaceæ.

Dillenia, Linn.
  23 Speciosa, Thunb.

Delima, Linn.
  24 Sarmentosa, D. C.

The first of these is exceedingly common; and the fruit, called *Otenga*, is eaten by the natives as eagerly, and apparently with as much zest, as mangoes are eaten in Bengal, or apples in England. The juice of this fruit is mixed with the Mishmee *Bih* to prepare the poison for arrows.

Umbelliferæ.

Ligusticum, Linn.
  25 Diffusum, Roxb.

Anethum, Tourn.
  26 Sowa, Roxb.

This part of Assam is meagre in Umbilliferæ; but the European esculents, Carrots, Parsley and Celery, succeed well here, and their cultivation might be increased to any extent, so far as to supply Calcutta with seed, if required.

Araliaceæ.

Aralia, Linn.
  27 Digitata, Roxb.

Panax, Linn.
  28 Aculeata, Ait.
  29 Fragans, Roxb.
  30 Species.

Several other species of this family are to be found near the hills, and in Muttuck.

Vitaceæ.

Vitis, Linn.
  20 Species,
No. 31 to 50.

Leea, Linn.
  9 Species,
No. 51 to 59.

A great variety of vine-like plants to be met with every where, the fruit scarcely edible; the ripe berries of some are eaten eagerly by the natives under the name of *Puniali.* Intense acidity, is sufficient to recommend any fruit to an

Assamese. The common grape vine might, without doubt, be cultivated on elevated spots in Upper Assam.

Olacineæ.

Olax, Linn.
60 Imbricata, Roxb.
61 Scandens, Roxb.

Ornamental plants, common.

Onagraceæ.

Œnothera, Linn.
62 Species.
63 Ditto.
Ludwigia, Linn.
64 Species.
65 Ditto.
Trapa, Linn.
66 Bispinosa, Roxb.

The first four are small plants with yellow flowers, the last produces the *Singhara* nuts, and is common in tanks.

Combretaceæ.

Terminalia, Linn.
67 Chebula, Retz.
68 Citrina, Roxb.
69 Angustifolia, Jacq ?
70 Catappa, Linn.
71 Species.
Combretum, Linn.
72 Acuminata, Roxb.
73 Chinensis, Roxb.
74 Rotundifolium, Roxb.
75 Pilosum, Roxb.
76 Species.
77 ———
78 ———

The first genus is composed of valuable timber trees, the other of ornamental climbing plants. T. Catappa, *Dessee Budam* of Bengal, has lately been introduced from the Botanic Garden.

Loranthaceæ.

Loranthus, Linn.
79 Bicolor, Roxb.
80 Globosus, Roxb.
81 Ferruginosus, Roxb.
82 Species.
83 ———

These are parasitical plants, called by the Assamese *Rogoo Mulla.* There is a vast variety of them in Assam.

Melastomaceæ.

Melastoma, Linn.
48 Malabathrica, Linn.
4 other species from No. 85 to 88.

These are highly ornamental, free-flowering plants, very abundant in Assam, called by the natives, *Phoot-kola.*

Myrtaceæ.

Psidium, Linn.
- 89 Pomiferum, Linn.
- 90 Species.

Syzygium, Gaert.
- 91 Jambolanum, D. C.
- 92 Fruticosum, D. C.
- 93 Nervosum, D. C.

Jambosa, Rumph.
- 94 Malaccensis, D. C.
- 95 Vulgaris, D. C.
- 96 Agnea, D. C.
- 97 Alba, W. and A.

Punica, Linn.
- 98 Granatum, Linn.

Barringtonia, Forst.
- 99 Acutangula, Gaert.
- 100 Racemosa, Roxb.

Careya, Roxb.
- 101 Arborea, Roxb.

Engenia, Linn.
- 102 Corymbosa, Linn. ?
- 103 Species.

The Guava, called *Mudhriam,* and the black *Jamrool Jamoo,* are exceedingly plentiful in the jungles: the Malacca *Jamrool,* called here *Amrool tinga,* is also very common. The Pomegranate in gardens.

Cucurbitaceæ.

Cucumis, Linn.
- 104 Melo, Linn.
- 105 Momordica, Roxb.
- 106 Sativus, Linn.
- 107 Pubescens, Willd.
- 108 Utillissimus, Roxb.

Luffa, Cav.
- 109 Acutangula, Roxb.
- 110 Pentandra, Roxb.

Bryonia, Linn.
- 111 Scabrella, Linn.
- 112 Umbellata, H. M.
- 113 Amplexicaulis, Linn.
- 114 Species.
- 115 ———

Trichosanthes, Linn.
- 116 Anguina, Linn.
- 117 Dioica, Roxb.
- 118 Peteroclita, Roxb.
- 119 Lobata, Roxb.

Cucurbita, Linn.
- 120 Citrullus, Linn.
- 121 Pepo, Linn.
- 122 Lagenaria, Linn.
- 123 Alba, Roxb.
- 124 Species.

Momordica, Linn.
- 125 Charantia, Linn.
- 126 Mixta, Roxb.
- 127 Muricata, Roxb.
- 128 Species.
- 129 ———
- 130 ———

This is a very useful tribe of plants in Assam; is very plentifully distributed, and very generally cultivated. There are several other species, or varieties, besides those here enumerated.

Cactaceæ.

Opuntia, Haw.
  131 Vulgaris, Haw. *Nagphunee*, Bengal.

This plant is not uncommon on the sites of old villages, but I cannot learn that the cochineal insect has ever been fed on it in Assam.

Begoniaceæ.

Begonia, Linn.
  132 Malabarica, Roxb.
  133 Laciniata, Roxb.
  134 Species.
  135 ———
  136 ———

Herbaceous flowering plants, the stalks of the leaves eagerly eaten by the natives.

Cruciferæ.

Brassica, Linn.
  137 Oleracea, Linn.
  138 Rapa, Linn.
Raphanus, Linn.
  139 Sativus, Linn.
Sinapis, Linn.
  140 Dichotoma, Roxb.
  141 Divaricata, Roxb.

With the exception of a few species of Mustard, this order is but sparingly distributed in Assam. The Cabbage, Radish, Turnip, and Cauliflower have been lately introduced; but are very successfully cultivated. Good seed might be grown here to supply the Calcutta market.

Capparidaceæ.

Cleome, Linn.
  142 Monophylla, Linn.
Polansia, Rafin.
  143 Icosandra, W. and A.
Roydsia, Wall.
  144 Species.
Capparis, Linn.
  145 Horrida, Linn. ?
Cynandropsis, D. C.
  146 Pentaphylla, D. C.
  147 Cleome.

These plants are either ornamental, or curious; G. pentaphylla, is called *Hoorhooria* by the natives.

Violaceæ.

Viola, Linn.
148 Species.
149 Species.

Violets are very common, only met with in the cold season, although they have not much scent.

Samydaceæ.

Casearia, Jacq.
150 Glabra, Boott ?
151 Vareca, Roxb.
152 Species.

Ornamental trees or shrubs, called *Shagellidoori.*

Papayaceæ.

Carica, Linn.
153 Papaya, Linn. Cultivated.

Flacourtiaceæ.

Flacourtia, L'Herit.
154 Cataphracta, Roxb.
155 Inermis, Roxb. ?
Choulmoogra, Roxb.
156 Odorata, Roxb.

The *Paniali*, of Bengal, is occasionally met with in villages. The C. odorata, *Lemtem*, is very common near the hills.

Guttiferæ.

Garcinia, Linn.
157 Camboogia, Desv.
158 Lanceœfolia, Roxb.
159 Purpurea, Roxb.
Xanthochymus, Roxb.
160 Dulcis, Roxb.
161 Pictorius, Roxb.
Mesua, Linn.
162 Ferrea, Linn.

These are all very ornamental trees. The Garcineæ are called *Tekera*, Xanthochymeæ *Tapar*, and M. ferrea *Nahor;* this last produces very durable timber, and on the hills grows much larger than in the plains. The seeds produce oil.

Ternstræmiaceæ.

Camellia, Linn.
163 Species.
Thea, Linn.
164 Viridis, Linn.

The Tea plant called *Phlap*, and *Khlàp* by the Assamese, is but thinly scattered over that portion of the valley to which these observations refer, the aggregate of all the little patches occupied by indigenous Tea would not exceed 2000 acres. The Camellia, No. 163, is called *Misa Phlap* in Muttock, in this part of the district *Heelkat.*

Aceraceæ.

Acer, Linn.
165 Oblongum, Wall. ? Ornamental.

Sapindaceæ.

Cardiospermum, Linn.
166 Halicacabum, Linn.
Schimdelia, Linn.
167 Serrata, D. C.
Sapindus, Linn.
168 Detergens, Roxb.
169 Saponaria, Linn. ?
170 Fruticosus, Roxb.
Pierardia, Roxb.
171 Sapida, Roxb.
172 Dulcis, Jack ?
Nephelium, Linn.
173 Longana, Linn.
Melicocca, Linn.
174 Bijuga, Linn.
Millingtonia, Roxb.
175 Simplicifolia.
176 Pinnata, Roxb.

Of this order, the most important to the Assamese, is P. sapida, yielding a pleasantly subacid fruit, called *Letckoo.* No. 169, comes from near the hills; it may not be the true Saponaria: the natives use the fruit as a substitute for soap.

Hippocastanaceæ.

Æsculus, Linn.
177 Species.

This is a very ornamental plant when in flower; compared with specimens of Æ. punduana, Wall. from the Botanic Garden not in flower, it appears to be the same: it is widely distributed. I found it on the banks of the Soobhan Siri, banks of the Dikho, banks of the Booree Dihing, banks of the Desang, and on the banks of the Suffry.

Polygalaceæ.

Polygala, Linn.
178 Arvensis, Willd.
Securidaca, Linn.
179 Paniculata, Linn.

S. paniculata is widely distributed, and very ornamental.

Linaceæ.

Linum, Linn.
180 Tetragynum, Coleb ?
181 Trigynum, Roxb.
182 Usitatissimum, Linn.

The first two are pretty, free-flowering plants; the flax ha been introduced by the Assam Company.

Sterculiaceæ.

Sterculia, Linn.
183 Coccinea, Roxb.
184 Villosa, Roxb.
185 Angustifolia, Roxb.
186 Balanghas, Linn.
187 Lanceœfolia, Roxb.
188 Species.
Bombax, Linn.
189 Malabaricum, D. C.
Pentapetes, Linn.
190 Phœnicea, Linn.
Kydia, Roxb.
191 Calycina, Roxb.
Abroma, Linn.
192 Angusta, Linn.
Commersonia, Forst.
193 Echinata, Forst.
Byttneria, Læf.
194 Aspera, Coleb.
195 Pilosa, Roxb.
196 Catalpæfolia, Jacq. ?
Pterospermum, Sch.
197 Lanceæfolium, Roxb.
Sterculia, Linn.
198 Species ?

Some of these grow to an immense size; blankets ar made of the cotton which envelopes the seed of the Bombax, or *Himool.* Boats are made of the trunk of this tree but they are not durable. The bark of *Oodal,* S. villosa, i in great demand among the elephant catchers.

Malvaceæ.

Malva, Linn.
199 Rotundifolia, Linn.
200 Species.
Urena, Linn.
201 Lobata, Linn.
202 Rigida, Wall.
203 Sinuata, Linn.
Sida, Linn.
204 Species.
205 Polyandra, Roxb.
206 Retusa, Linn.
207 Rhombifolia, Wall.
208 Species.
Abutilon, Mœnch.
209 Indicum, Don.
210 Species.
211 Moschatus, Mœnch.
Abelmoschus, Med.
212 Esculentus, W. and A.

Gossypium, Linn.
213 Acuminatum, Roxb.
214 Species.
Hibiscus, Linn.
215 Macrophyllus, Roxb,
216 Pentaphyllus, Roxb.
217 Species.
218 Scandens, Roxb. ?
219 Rosa-sinensis, Linn.
220 Species.
221 ———
222 ———

These are for the most part ornamental plants. Gossypium, the cotton, is very generally cultivated, though in a rather slovenly manner; the seed is sown broadcast, the plants come up very thick, and starve each other. The variety which is cultivated by some of the Hill tribes is much smaller than that of the plains, being when at maturity not more than one foot in height.

Dipteraceæ.

Shorea, Roxb.
223 Robusta, Roxb.

This, the *Sal* or *Hal* of the Assamese, is the only tree I have to place here at present, specimens have been brought to me from *Sang Mai Habbi.* I have frequently heard of the *Makai*, the *Hoollung*, and several other large resinous trees which, I presume, belong to this order.

Elæocarpaceæ.

Elæocarpus, Linn.
224 Lucidus, Roxb.
225 Rugosus, Roxb.
226 Aristatus, Roxb.
227 Species.

Ornamental trees, producing an acid fruit called *Naga Tinga*, and the *Roodrack*, highly prized for beads by the Hindoos.

Tiliaceæ.

Corchorus, Linn.
228 Acutangulus, Linn.
229 Capsularis, Linn.
230 Olitorius, Linn.
231 Trilocularis, Linn.
232 Species.
Triumfetta, Linn.
233 Oblonga, Wall.
234 Ovata, Wall. ?
235 Trilocularis, Roxb.
Grewia, Linn.
236 Orientalis, Linn.

237 Tomentosa, Juss.
238 Lanceœfolia, Roxb.
239 Columnaris, Smith.
240 Pumilis, Wall.
241 Species.
242 Species.
243 ———
244 ———
245 ———
246 ———

Several species of the genus Corchorus are very common, but I have never seen any under cultivation; the hemp, *Pat*, or *Murra Pat* sold in the bazars, is procured from Bengal.

Salicarieæ.

Lawsonia, Linn.
247 Inermis, Linn.
Lagerstrœmia, Linn.
248 Grandiflora, Roxb.
249 Indica, Linn.
250 Reginæ, Roxb.
251 Species.

I know not if No. 247 differs from L. alba, Lam, and W. and A.; the petals of all the flowers that I have seen are bright yellow. L. grandiflora, *Kukum*, a native of Chittagong, is common here, I found it growing to an immense size in the brickwork of the old palace at Gurgaon, and have seen it on the first range of hills. L. Reginæ, *Azar*, is a first-rate timber tree. No. 251 is probably L. elegans, Wall.; but I have not a description of Dr. Wallich's plant. L. Indica was introduced from the Botanic Garden.

Meliaceæ.

Amoora, Roxb.
252 Cucullata, Roxb.
Guarea, Linn.
253 Binectarifera, Roxb.
Aglaia, Lour.
254 Odorata, Lour.
255 Undulata, Wall.
Melia, Linn.
256 Species.

G. binectarifera, *Bondur Demoora*, is a very common plant; both species of Aglaia were introduced from the Botanic Garden. I have heard of the *Neem*, Azadirachta Indica, being found in villages, I suppose introduced.

Cedrelaceæ.

Cedrela, Linn.
257 Toona, Roxb.
Poma, Assamese.

Very fine specimens of the Toon are to be met with; it makes fine boats.

Aurantiaceæ.

- Triphasia, Lour.
  - 258 Trifoliata, D. C.
- Limonia.
  - 259 Species.
  - 260 ———
  - 261 ———
- Bergera, Kon.
  - 262 Integerrima, Roxb.
  - 263 Konigii, Roxb.
- Glycosmis, Corr.
  - 264 Citrifolia, W. and A.
  - 265 Pentaphylla, D. C.
- Feronia, Corr.
  - 266 Elephantum, Corr. ?
- Ægle, Corr.
  - 267 Marmelos, Corr.
- Citrus, Linn.
  - 268 Acida, Roxb.
  - 269 Aurantium, Linn.
  - 270 Medica, Linn. ?
  - 271 Species.

Of the genus Citrus, there is an immense variety, distributed all over the country, on the banks of rivers chiefly. Nothing appears so agreeable to the Assamese palate as acid fruits, called by them *Tinga*. Messrs. Wight and Arnott observe that B. integerrima, Roxb. is a species of Micromelum.

Spondiaceæ.

- Spondias, Linn.
  - 272 Acuminata, Roxb.
  - 273 Mangifera, Roxb. *Amra.*
  - 274 Species.

The *Amra* is common, both on the hills and in the plains, and eagerly eaten.

Rhamnaceæ.

- Ceanothus, Linn.
  - 275 Nepalensis, Wall. ?
- Hovenia, Thunb.
  - 276 Inæqualis, D. C. ?
- Ventilago, Gært.
  - 277 Madraspatana, Gært.
- Zizyphus, Tourn.
  - 278 Jujube, Lam.
- Colubrina, Rich.
  - 279 Asiatica, Brong.

The Jujube, *Boghori,* is one of the most common plants, and the fruit is much sought after.

Euphorbiaceæ.

Sarcococca, R. Br.
280 Pruniformis, R. Br.
Bradlica, Gært.
281 Amœna, Wall. ?
282 Multilocularis, Roxb.
283 Lanceœlaria, Roxb.
Emblica, Gært.
284 Officinalis, Gært.
Andrachne, Linn.
285 Trifoliata, Roxb.
Dalechampia, Linn. ?
286 Species ?
287 ——— ?
288 ——— ?
Excœcaria, Linn.
289 Agallocha, Linn.
Sapium, Jacq.
290 Sebiferum, Roxb.
Cluytia, Linn.
291 Collina, Roxb.
292 Oblongifolia, Roxb.
293 Scandens, Willd.
Briedelia, Willd.
294 Attenuata, Wall. ?
295 Lanceæfolia, Roxb.
Croton, Linn.
296 Drupacium, Roxb.
297 Elæcocarpifolium, Wall.
298 Janfra, Roxb.
299 Oblongifolium, Roxb.
300 Tiglium, Linn.

Adelia, Linn.
301 Nereifolia, Roxb.
Phyllanthus, Linn.
302 Incanus, Wall. ?
303 Patens, Roxb.
304 Retusus, Roxb.
305 Strictus, Roxb.
306 Trinervia, Wall. ?
307 Vitis-idea, Roxb.
308 Species.
309 ———
310 ———
311 ———
Rottlera, Roxb.
312 Barbata, Wall. ?
313 Tetracocea, Roxb.
314 Tinctoria, Wall. ?
315 Tricocca, Wall. ?
316 Species.
317 Peltata, Roxb.
Ricinus, Linn.
318 Communis, Linn.
319 Species.
Janipha, Kunth.
320 Manihot, Kunth ?
Jatropha, Linn.
321 Curcas, Linn.
Euphorbia, Linn.
322 Chamæsyce, Lam. ?
323 Hirta, Jacq.
324 Tirucalli, Linn.
325 Species.

Of this order several plants are of prime importance to the Assamese. The fruit of E. officinalis, *Amlooki*, is eagerly eaten; the wood of A. trifoliata, *Ooriam*, is much used in building, and is very plentiful. C. tiglium, *Koni-bih*, is common in all villages, and made use of in poisoning fish: the Rottlereæ are esteemed for firewood, especially R. peltata? *Jugguroo.* R. communis, *Era,* grows wild, and is cultivated, but only for feeding the worm which produces the *Eria* silk. Janipha manihot? *Gosh alloo,* is often used for hedges, and is not unfrequent in the jungles near the hills; it does not appear to have any poisonous qualities in a green state as the Assamese eat the root eagerly when raw.

Celastrineæ.

Celastrus, Linn.
  326 Montana, Roxb.
  327 Nutans, Roxb.
  328 Latifolia, Wall.?
  329 Species.
  330 ———
Euonymus, Linn.
  331 Glabra, Roxb.
  332 Scandens?
  333 Species.
  334 ———
  335 ———
  336 Species.
  337 ———
  338 ———
  339 ———
Hippocratea, Linn.
  340 Indica, Willd.
  341 Vinimea, Wall.?
Salacia, Linn.
  343 Longifolia, Wall.
  344 Species.
  345 ———
  346 ———

These are ornamental, or curious plants with inconspicuous flowers.

Malpighiaceæ.

Hiptage, Gært.
  347 Madablota, Gært.

This is a very ornamental plant, producing numerous fragrant flowers.

Tamaricineæ.

Tamarix, Linn.
  348 Indica, Willd.?

Common on the sandbanks of the Brahmapootra, though I have seen no large trees in the plains.

Illecebraceæ.

Pharnaceum, Linn.
  349 Pentagynum, Roxb.
Molluga, Linn.
  350 Pentaphylla, Linn.

These are small plants, weeds.

Xanthoxylaceæ.

- Todalia, Juss.
  - 351 Aculeata, Pers.
- Xanthoxylum, Linn.
  - 352 Podacarthum, Wall. ?
  - 353 Species.

Generally thorny plants, with aromatic, pungent leaves and berries.

Balsaminaceæ.

- Impatiens, Linn.
  - 354 Species.
  - 355 Species.
  - 356 ———

Of this genus there are many varieties, or species; the common annual English Balsam thrives here in the rains.

Oxalidaceæ.

- Averrhoa, Linn.
  - 357 Carambola, Linn.
- Oxalis, Linn.
  - 355 Sensitiva, Linn.
  - 359 Species.

The first of these, the *Kamrunga* of Bengal, here called *Korja tinga*, is a great favorite with the natives. I have met with some very large trees of it.

Rosaceæ.

- Rosa, Linn.
  - 360 Species.
- Rubus, Linn.
  - 361 Gracilis, Roxb. ?
  - 362 Rugosus, Smith.
  - 363 Hexagonus, Roxb.
- Amygdalus, Linn.
  - 364 Vulgaris, Hort.
- Photinia, Lindl.
  - 365 Species.
  - 366 ———

Of wild Roses I have not met with any great variety ; such as have been introduced into gardens from Bengal succeed remarkably well, and blossom freely. Of Raspberries, there is a greater variety, called *Jetooli poka*, but none of them very palatable ; the common rough-skinned Peach is found in most villages, both in the plains and on the hills.

Leguminosæ.

- Abrus, Linn.
  - 367 Precatorius, Linn.
- Acacia, Neck.
  - 368 Arabica, Willd. ?

369 Pennata, Willd.
370 Speciosa, Willd.
371 Stipulata, D. C.
Arachis, Linn.
372 Hypogæa, Linn.
Bauhinia, Linn.
373 Acuminata, Linn.
374 Purpurea, Linn.
375 Triandra, Roxb.
376 Variegata, Linn.
Butea, Roxb.
377 Frondosa, Roxb.
Cæsalpinia, Linn.
378 Digynia, Roxb.
379 Species.
Cajanus, D. C.
380 Indicus, Spren.
Cathartocarpus, Pers.
381 Fistulus, Pers.
Clitoria, Linn.
382 Ternatea, Linn.
Cassia, Linn.
383 Alata, Linn.
384 Occidentalis, Linn.
385 Sophora, Linn.
386 Tora, Linn.
387 Bicapsularis, Linn.
388 Toroides, Roxb.
389 Dimidiata, Roxb.
Crotalaria, Linn.
390 Bialata, Roxb.
391 Stricta, Roxb.
392 Verrucosa, Linn.
393 Ramosissima, Roxb.
394 Tenuifolia, Roxb.
395 Species.
396 ———
Dalbergia, Linn.
397 Emarginata, Roxb.
398 Marginata, Roxb.
399 Rimosa, Roxb.
400 Zeylanica, Roxb.
401 Ougeinensis, Roxb.
402 Species.
403 ———
404 ———
405 ———
Glycine, Linn.
406 Species.
Desmodium, Desv.
407 Gyrans, D. C.
408 Latifolium, D. C.
409 Polycarpum, D. C.
410 Triflorum, D. C.
411 Triquetrum, D. C.
412 Cephalotes, Wall.
413 Gyroides, D. C.
Dicerma, D. C.
414 Pulchella, D. C.
Dolichos, Linn.
415 Glutinosus, Roxb.
416 Pilosus, Roxb.
417 Mollissimus, Wall. ?
418 Rotundifolius, Volh.
419 Catjan, Linn.
420 Species.
Erythrina, Linn.
421 Glauca, Linn.
422 Stricta, Roxb.
Flemingia, Roxb.
423 Strobulifera, R. Br.
424 Stricta, Roxb.
Inga, Plum.
425 Bigesnina, Willd.

426 Umbellata, Wild.
Jonesia, Roxb.
427 Asoca, Roxb.
Robinia, Linn.
428 Ferruginea, Roxb.
429 Fruticosa, Roxb.
430 Macrophylla, Shreb.
Smithia, Ait.
431 Aspera, Roxb.
Tamarindus, Linn.
432 Indica, Linn.
Tephrosia, Pers.
433 Candida, D. C.
Uraria, Desv.
434 Campanulata, Wall.
435 Crinita, Desv.
436 Lagopoides, D. C.
437 Picta, Desv.
438 Floribunda, Wall.
Canavalia, Adans.
439 Gladiata, D. C.
440 Virosa, W. and A.
Guilandina, Linn.
441 Bonduc, Willd.
Lablab, Adans.
442 Vulgaris, Savi.
Lathyrus, Linn.
443 Sativus, Linn.
Myroneurum, Desf.
444 Cuculatum, W. and A.
Pongamia, Linn.
445 Glabra, Vent.
446 Uliginosa, D. C.
Psoralia, Linn.
447 Coryliflora, Linn.
Pterocarpus, Linn.
448 Dalbergioides, Roxb.
Rhynchosia, Lour.
449 Madicaginea, D. C.
Phaseolus, Linn.
450 Radiatus, Linn.
451 Rostratus, Wall.
452 Truncatus, Linn.
453 Alatus, Linn.
Judigofera, Linn.
454 Tinctoria, Linn.
Hedysarum, Linn.
455 Species.
456 ———
Vachellia, W. and A.
457 Farnesiana, W. and A.

These consist of immense timber trees, eminently ornamental flowering shrubs, elegant climbers, and herbaceous pulse-bearing plants. A. hypogæa, the earth-nut, I have seen only in a few gardens; I presume it has been lately introduced from the Botanic Garden. The different kinds of Dolichos and Canavalia, *Seem* of Bengal, are plentiful, and occasionally cultivated. C. Indicus, *Urhur*, is also cultivated, as is P. radiatus? *Mas kulai*,—*Matti ma* of the Assamese: sown in October or early in November. All the kinds of English Peas and French Beans succeed remarkably well till comparatively late in the season. French Beans plentiful to the end of May, and might be produced in every month in the year, with proper attention. Abundance of seed Peas could be grown in Assam, if required for the Calcutta Market.

Connaraceæ.

Connarus, Linn.
458 Nitidus, Roxb.

Cnestis, Jack.
459 Monadelpha, Roxb.

Curious and ornamental plants.

Crassulaceæ.

Kalanchoe, Adans.
460 Laciniata, D. C.

A curious herbaceous plant.

Anacardiaceæ.

Semicarpus, Linn.
461 Anacardium, Linn.
462 Cuneifolium, Roxb.
Pendidiflora, Wall.
Mangifera, Linn.
463 Indica, Linn.

Rhus, Linn.
465 Bucku Amela, Roxb.
466 Juglandifolia, Hen.
467 Vernix, Linn.
Phlebochiton, Wall.
468 Extensum, Wall.

The Mango, *Am*, is very common in villages, and often to be met with in the jungles; the fruit often infested with insects. This order yields the famous varnish *Ahom Etha*, reported to be produced by Melanorrhæa usitata, Wall. This I have not yet met with in Assam; the plant which has been invariably pointed out to me as the "*Ahom Etha*," is a species of Rhus, and what may be R. vernix.

Cupuliferæ.

Quercus, Linn.
469 Species.

Castanea, Gært.
470 Species.
471 ———

Chestnut trees are very common in the plains, and Oaks plentiful on the hills.

Urticaceæ.

- Urtica, Linn.
  - 472 Alienata, Roxb.
  - 473 Crenulata, Roxb.
  - 474 Macrostachya, Wall. ?
  - 475 Penduliflora, Wall. ?
  - 476 Pulcherrima, Roxb.
  - 477 Pentandra, Roxb.
  - 478 Scabrella, Roxb.
  - 479 Subperforata, Wall.
  - 480 Nivea, Linn.
  - 481 Pulchella, Linn. ?
  - 19 Other species, from No. 482 to 500.
- Canabis, Linn.
  - 501 Sativa, Linn.
- Morus, Linn.
  - 502 Atropurpurea, Roxb.
  - 503 Alba, Linn. ?
- Broussonetia, Vent.
  - 504 Papyrifera, Vent.
  - 505 Assamica, Wall.
- Ficus, Linn.
  - 506 Cordifolia, Roxb.
  - 507 Elastica, Roxb.
  - 508 Hirta, Roxb.
  - 509 Indica, Vahl.
  - 510 Macrophylla, Desf.
  - 511 Religiosa, Linn.
  - 512 Retusus, Willd.
  - 513 Scandens, Roxb.
  - 514 Jewry, Griff. ?
  - 515 Peterophylla, Linn.
  - 516 Excelsa, Vahl.
  - 517 Nitida, Thunb.
  - 518 Oppositifolia, Roxb.
  - 519 Lanceæfolia, Ham.
  - 520 Longifolia, Wall. ?
  - 521 Scabrida, Wall. ?
  - 522 Virgata, Roxb.
  - 12 Other species, from No. 523 to 534.
- Artocarpus, Forst.
  - 535 Integrifolius, Linn.
  - 536 Lakoocha, Roxb.
- Batis, Linn.
  - 537 Aurantiaca ?
- Trophis, Linn.
  - 538 Aspera, Retry.
- Ceratophyllum, Linn.
  - 539 Verticillatum, Roxb.
- Bæhmeria, Linn.
  - 540 Vininea ?

Assam may be considered the garden of Nettles and Fig trees. These abound in every part of it, some of them are eminently ornamental, some eminently useful, and some emi-

ing

ese

not

ied

by the slightest possible touch of the little white berries on my chin, and the back of my hand. U. nivea, *Rheea*, is cultivated by the fishermen for making their nets. B. papyrifera was lately introduced from the Botanic Garden. Dr. Wallich sent me up some cuttings by dâk, and also some cuttings of the M. multicaulis, which grow freely. B. Assamica is abundant in Muttock; it makes a very strong, serviceable paper. The *Kant'hal,* A. integrifolius, is so plentiful, that it is daily felled for building purposes; as is the *Sam,* A. chaplasha.

Ulmaceæ.

Celtis, Linn.
541 Orientalis, Linn.
3 Other Species, to No. 544.

These are free-growing ornamental plants, springing up very thick on fresh cleared ground.

Stilaginaceæ.

Stilago, Linn.
545 Bunias, Linn.
546 Diandra, Roxb. ?
Antidesma, Linn.
547 Paniculata, Roxb.
548 Species.

The first two, called *Helos*, grow to be considerable trees; the latter two, *Pani-Helos*, are of smaller growth: all produce a profusion of small sub-acid berries, which are eagerly eaten by the natives.

Myriceæ.

Putranjiva, Wall.
549 Roxburghii, Wall.

This plant is widely distributed; the wood is valuable, but I have not hitherto met with any very large trees.

Juglandeæ.

Juglans, Linn.
550 Species.

Walnuts have been brought to me from the Naga hills, but I have not seen any trees in the plains producing edible fruit.

Piperaceæ.

Piper, Linn.
551 Betle, Linn.
552 Chuvya, Roxb.
553 Longum, Linn.
554 Species.
555 ———
556 ———

The *Pan*, of which so much is consumed by the Assamese, is very little cultivated in the plains; the Bazars in this district are supplied principally by the Nagas, who cultivate, or rather grow it on the slopes, and at the foot of their Hills.

Elæagneacæ.

Elæagnus, Linn.
557 Conferta, Roxb.

An ornamental, though straggling shrub, with silver coloured scales.

Aquilariaceæ.

Aquilaria, Lam.
558 Agallocha, Roxb.

This large, erect growing tree is plentiful, and called *Hansi*; the bark may be stripped off in large pieces without much injury to the plant: it is used to write on, and for various other purposes, and makes a very strong and durable paper.

Lauraceæ.

Cinnamomum, R. Br.
559 Cassia, Don.
560 Obtusifolium, Nees ?
Laurus, Plin.
561 Bilocularis, Roxb.
562 Species.
Tetranthera, Jacq.
563 Bifaria ?
564 Macrophylla, Roxb.
565 Nitida, Roxb.
566 Roxburghii, Nees.
567 Lanceæfolia, Roxb.
568 Fasciculata, Wall. ?
569 Oblongifolia, Wall. ?
570 *Soom.*
571 to 574, Species.

Several species, or varieties of Cinnamon, or Laurus, are met with near the hills; but I have no good description of these three Genera to enable me to distinguish the different species. The most important to the Assamese is the *Soom*, with the leaves of which the *Moonga* Silk-worm is fed.

Aristolochiæ.

Aristolochia, Linn.
575 Indica, Linn.

A curious, climbing plant. Introduced ?

Amaranthaceæ.

- Deeringia, R. Br.
  - 576 Celosioides, Roxb.
- Amaranthus, Linn.
  - 577 Caudatus, Linn.
  - 578 Tristis, Roxb.
  - 579 Paniculatus, Linn.
  - 580 Spinosa, Roxb.
- Celosia, Linn.
  - 581 Argentea, Roxb.
  - 582 Cristata, Roxb.
  - 583 Cernua, Roxb.
- Achyranthes, Linn.
  - 584 Aspera, Linn.
  - 585 Lapacea, Roxb.
  - 586 Triandra, Roxb.
  - 587 Species.
  - 588 ———
- Desmochæta, D. C.
  - 589 Velutina, Wall. ?

Common herbaceous plants, or weeds; the Amarantheæ are used as pot herbs. *Hak.*

Chenopodiaceæ.

- Basella, Linn.
  - 590 Alba, Linn.
  - 591 Rubra, Linn.

These two species or varieties, are cultivated occasionally; *Pooe-hak*, or *Porooi-hak.* But there is a wild variety, *Horoo Porooi*, which is very common near the hills, and is a great favorite with the natives. Chenopodia viride, *Jilliy-milly*, is also common, and eaten.

Phytolaceæ.

- Bivina, Linn.
  - 592 Lævis, Linn.

An ornamental flowering plant, found in gardens; probably introduced from the Botanic Garden.

Polygonaceæ.

- Polygonum, Linn.
  - 593 Chinensis, Linn.
  - 594 Pilosum, Roxb.
  - 595 Elegans, Linn.
  - 596 Horridum, Buch.
  - 597 Perniculatum, Wall. ?
  - 598 to 605. 8 other species.
- Rumex, Linn.
  - 606 Acutus.
  - 607 Species.

This tribe is very plentiful; besides the above there are many other species. P. Fagopyrum, Buck-Wheat, is cultivated by some of the Hill people.

Nyctaginaceæ.

Mirabilis, Linn.
608 Jalapa, Linn.
Boerhaavia, Linn.
609 Species.
610 ———

The first of these, Marvel of Peru, is not unfrequently seen in villages.

Menispermaceæ.

Cocculus, D. C.
611 Acuminatus, D. C.
612 Cordifolius, D. C.
Menispermum, Linn.
613 Species.
614 Species.
Cissampelos, Linn.
615 Glabra, Roxb.
616 Hernandifolia, Wall. ?
617 Hexandra, Roxb.

These are trailing, climbing plants, with inconspicuous flowers; the juice of C. cordifolius, *Anemeluta*, or *Hoogoonluta*, is taken inwardly for shortness of breath and cough.

Myrsinaceæ.

Myrsine, Linn.
618 Capitellata, Roxb.
619 Species.
Ardisia, Swartz.
620 Colorata, Roxb.
621 Floribunda, Wall. ?
622 Umbellata, Wall. ?
623 Pedunculosa, Wall.
624 Solanacea, Roxb.
625 Hymenandra, Wall.
Mæsa, Forst.
626 Nemoralis, Wall.
627 Species.

Common, ornamental flowering shrubs.

Sapoteæ.

Chrysophyllum, Linn.
628 Acuminatum, Roxb.
Mimusops, Linn.
629 Elengi, Linn.

The first of these, called *Bonpita*, yields an insipid, clammy fruit, eagerly eaten; the other, *Bokhool*, small, fragrant flowers.

Ebenaceæ.

Diospyros, Linn.
630 Glutinosa, Koen.
631 Racemosa, Roxb.
632 Ramiflora, Roxb.
633 Stricta, Roxb.
634 Species.

Ornamental trees producing astringent fruit, and serviceable timber; the first, *Kendoo*, is the *Gab* of Bengal, and is used here also for paying boats.

Convolvulaceæ.

- Argyreia, Lour.
  - 635 Aggregata, Chois.
  - 636 Argentea, Chois.
  - 637 Spinosa, Chois.
  - 638 Splendens, Swt.
  - 639 Species.
- Quamoclit, Tourn.
  - 640 Coccinea.
- Porana, Linn.
  - 641 Paniculata, Roxb.
- Ipomæa, Chois.
  - 642 Grandiflora, Roxb.
  - 643 Obscura, Chois.
- Convolvulus, Chois.
  - 644 Paniculatus, Roxb.
  - 645 Turpethum, Roxb.
  - 646 Viscidus ?
  - 647 Marginatus, Linn.
  - 648 Vitifolius, Willd.
  - 649 Species.
  - 650 Obscurus, Willd.
    different from 643 ?
  - 651 Species.

All these are ornamental, free flowering, trailing, or climbing plants.

Lobeliaceæ.

- Lobelia, Linn.
  - 652 Robusta, Wall.

An elegant, annual plant, with white flowers, common on the low hills in February.

Cinchonaceæ.

- Nauclea, Linn.
  - 653 Cadamba, Roxb.
  - 654 Species.
- Uncaria, Schneb.
  - 655 Pilosa, Roxb.
  - 656 Sessilefructus, Roxb.
- Mussænda, Linn.
  - 657 Corymbosa, Roxb.
  - 658 Frondosa, Linn.
  - 659 Glabra, Vahl.
  - 660 Macrophylla, Wall. ?
  - 661 Species.
- Stylocoryna, Cor.
  - 662 Webera, Rich.
- Gardenia, Ellis.
  - 663 Campanulata, Roxb.
  - 664 Thunbergia, Linn. ?
- Randia, Houst.
  - 665 Decussata, Wall. ?
  - 666 Longispina, D. C.
- Vangueria, Comm.
  - 667 Spinosa, Roxb.
- Rondeletia, Plum.
  - 668 Paniculata, Roxb.

669 Tinctoria ?
Morinda, Vaill.
670 Angustifolia, Roxb.
671 Exserta, Roxb.
Pæderia, Linn.
672 Fœtida, Linn.
Ixora, Linn.
673 Bandhuca, Roxb.
674 Barbata, Roxb.
675 Brachiata, Roxb.
676 Incarnata, Roxb.
677 to 680, 4 species.
Pavetta, Linn.
681 Indica, Linn.
682 Tomentosa, Smith.
Coffea, Linn.
683 Arabica, Linn.
684 Bengalensis, Roxb.
Psychrotia, Linn.
685 Macrophylla, Wall. ?
686 Undata, Jacq.
687 Grandiflora, Wall. ?
688 Species ?
Spermacoce, Linn.
689 Scabra, Linn.
690 Teres, Roxb.

These are for the most part, ornamental free-flowering shrubs, or small trees, widely distributed. N. cadamba, *Rhogoo*, is of larger growth, producing serviceable timber. The coffee has been introduced within the last six or seven years, and thrives remarkably well, planted under partial shade, on ground sufficiently elevated to allow the superfluous water to run off; no coffee plants could succeed better in any country, than a few that are now growing in Captain Brodie's garden at Seebsagur; they were seedlings, obtained from the Botanic Garden in 1839, and planted by Dr. F. Furnell, on the bank of the tank, exposed to the evening sun, but shaded in the fore part of the day. I consider the elevation, or slope of the ground, to be more essential to the success of coffee plantations in Upper Assam, than shade. Should it be the wish of the Company to extend the cultivation of coffee, plenty of ground may be found well adapted for the experiment at Gabhoroo Purbut, Chereideo, or at Deopany, or any other place near the hills.

Compositæ.

Artemisia, Linn.
691 Grata, Wall.
692 Indica, Willd.
Bidens, Linn.
693 Chinensis, Willd.
694 Wallichii, D. C.

695 Tripartita, Roxb.
696 Decomposita, Wall.
Cacalia, Linn.
697 Species.
698 ———
Centaurea, Linn.
699 Species.
Chrysanthemum, Linn.
700 Indicum, Willd.
Conyza, Linn.
701 Angustifolia, Roxb.
702 Balsamifera, Linn.
703 Læta, Wall.
10 Other species ? from
704 to 713.
Eclipta, Linn.
714 Prostrata, Linn.
Eupatorium, Linn.
715 Vagans ?
Elephantopus, Cass.
716 Scaber, Linn.
Hingsha, Roxb.
717 Repens, Roxb.
Sonchus, Linn.
718 Oxiensis, Roxb.
719 Species.
Spilanthes, Jacq.
720 Acmella, Wall. ?
Verbesina, Linn.
721 Calendulacea, Willd.
Xanthium, Tourn.
722 Cordatum, Wall.
723 Indicum, Roxb.

Chiefly herbaceous flowering plants, or useless weeds. Lettuces succeed well here, from October to May; and might be cultivated for seed to any extent, near the hills.

Plantaginaceæ.

Plantago, Linn.
724 Attenuata, Wall.
725 Species ?

Common road-side plants.

Plumbaginaceæ.

Plumbago, Linn.
726 Rosea, Linn.
727 Zeylanica, Roxb.

Very pretty, free-flowering small shrubs.

Cordiaceæ.

Cordia, Linn.
728 Myxa, Linn.
729 Species.

Middling sized trees; wood soft, but useful.

Ehretiaceæ.

Ehretia, Linn.
730 Lævis, Roxb.
731 Serrata, Roxb.
Heliotropium, Linn.
732 Indicum, Roxb.

The first two called *Bual*, produce serviceable timber; the latter is a common road-side plant, or weed.

Boragimæ.

- Boraga, Linn.
  - 733 Indica, Roxb.
- Trichodesma, R. Br.
  - 734 Zeylanica, R. Br.

Common road-side plants.

Labiatæ.

- Ocymum, Linn.
  - 735 Sanctum, Linn.
  - 736 Gratissimum, Linn.
  - 737 Thyrsiflorum, Wall. ?
  - 738 Species.
- Plectranthus, L'Herit.
  - 739 Amethysticus, Roxb.
  - 740 Rugosus ?
- Mentha, Linn.
  - 741 Perilloides, Roxb.
  - 742 Species.
- Salvia, Linn.
  - 743 Brachiata, Roxb.
- Scutellaria, Linn.
  - 744 Viscosa, Wall.
  - 745 Cana, Wall.
- Lincas, R. Br.
  - 746 Species.
- Phlomis, Linn.
  - 747 Zeylanica, Willd.
  - 748 Esculenta, Roxb. ?
- Ajuga, Linn.
  - 749 Disticha, Roxb.
  - 750 Fruticosa, Roxb.
- Hyptis, Jacq.
  - 751 Species.
  - 752 Suaveolens ?
  - 753 Species.

Common plants, generally with fragrant flowers or leaves. The English Lavender, Thyme, Mint, Sage and Marjorum, would probably succeed, and be very acceptable, especially to Europeans.

Verbenaceæ.

- Clerodendrum, Linn.
  - 754 Glandulosum ?
  - 755 Hastatum, Wall. ?
  - 756 Infortunatum, Linn.
  - 757 Serratum, Don.
  - 758 Siphoranthus, R. Br.
  - 759 Trichotomum, Thun.
  - 760 to 763 Species.
- Callicarpa, Linn.
  - 764 Arborea, Roxb.
  - 765 Cana, Linn.
  - 766 Dentata, Wall.
  - 767 Lanceolaria, Roxb.
  - 768 Macrophylla, Roxb.
  - 769 Purpurea, Juss.
  - 770 Villosa, Roxb.

771 Species.
Premna, Linn.
772 Esculenta, Roxb.
773 Grandiflora ?
Vitex, Linn.
774 Heterophylla, Roxb.
775 Incisa, Linn.
776 Leucoxylon, Linn.
777 Negundo, Linn.
Streptium, Roxb.
778 Asperum, Roxb.
Verbena, Linn.
779 Species.
780 ———
Lantana, Linn.
781 Cammara ?

These are, for the most part, ornamental flowering shrubs; a few yield serviceable timber. V. negundo, *Pasootia,* is common about villages; an infusion of the leaves and young shoots is used in fomentations for a cold in the head, and also as poultice applied to wounds or swellings. L. camara ? has been lately introduced from the Botanic Garden.

Pedaliaceæ.

Sesamum, Linn.
782 Orientale, Linn.

This plant, *Teel,* is common about villages. I am not aware that the Assamese make any use of it.

Bignoniaceæ.

Bignonia, Linn.
783 Indica, Willd. *Bat Ghilla.*
784 Chelonoides, Willd. *Parooli.*

These are both common; the wood of the first is soft, and of little value: the latter, *Parooli,* yields valuable timber.

Acanthaceæ.

Thunbergia, Linn.
785 Grandiflora, Roxb.
Ruellia, Linn.
786 Dependens, Roxb.
787, 788, 789, Species.
Strobilanthus, Blum.
790 Auriculata, Wall.
791 Sabiniana ?
792 Species.
Goldfussia, Nees.
793 Species.
Barleria, Linn.
794 Cristata, Linn.
795 Species.
796 ———
Phlogocanthus, Nees.
797 Curviflorus ?
798 Thyrsiflorus, Wall.

Eranthemum, R. Br.
799 Pulchellum, Wall. ?
800 Strictum, Roxb.
Justicia, Linn.
801 Adhatoda, Linn.
802 Betonica, Vahl.
803 Citrifolia ?
804 Ecbolium, Roxb.
805 Pectinata, Roxb.
3 Other species, from 806 to 808.
Peristrophe, Nees.
809 Lanceolaria, Wall. ?
810 Speciosa, Wall. ?
Andrographis, Wall.
811 Pedunculata, Wall.

All very ornamental, free-flowering shrubs or small plants. The young tender shoots of several are eaten as *Hak* by the Assamese. J. adhatoda, *Boga tita;* and P. thyrsiflorus, *Bungatita,* this plant forms serviceable and ornamental hedges, growing 10 or 12 feet high: when kept properly pruned, it has an elegant appearance at the time of flowering.

Lentibulaceæ.

Utricularia, Linn.
812 Fasciculata, Roxb.
813 Species.

Curious aquatic plants, producing yellow flowers, found plentifully swimming on the tank at Ligri Pookuri.

Gesneraceæ.

Columnea, Linn.
814 Balsamica, Linn.
815 Heterophylla, Roxb.

Small, herbaceous plants with reddish purple flowers, found in rice fields.

Scrophulariaceæ.

Scoparia, Linn.
816 Dulcis, Linn.
Gratiola, Linn.
817 Reptans, Roxb.
818 Monnieria, Roxb. ?
819 Species.
820 ———
Buddleia, Linn.
821 Neemda, Roxb.
Capraria, Linn.
822 Gratissima, Roxb.
823 Diffusa, Roxb. ?
824 Species.
Torenia, Linn.
825 Hians, Roxb.
826 Species.
9 Other species ? from 827 to 835.

Chiefly small, herbaceous plants. B. neemda, is a very ornamental shrub, with numerous white, fragrant flowers.

Salanaceæ.

Capsicum, Linn.
  836 Annuum, Roxb.
  837 Purpureum, Roxb.
Physalis, Linn.
  838 Alkekingi, Linn.
  839 Pubescens, Linn.
Datura, Linn.
  840 Fastuosa ?
  841 Metel, Roxb.
  842 Lævis, Roxb.
Nicotiana, Linn.
  843 Quadrivalvis, Pursh.
  844 Tobacum, Linn.
Solanum, Linn.
  845 Hirsutum, Roxb.
  846 Pubescens, Willd.
  847 Indicum, Linn.
  848 Jacquini, Willd.
  849 Longum, Roxb.
  850 Melongena, Linn.
  851 Nigrum, Linn.
  852 Spirale, Roxb.
  853 Species.

Capsicums, *Jalook*, Tobacco, *Dhopat*, and Brinjals *Bengana*, are the most important among these; large quantities of Capsicums are brought down by the Nagas. To this family belongs the Potato, which succeeds remarkably well on elevated ground, and no doubt might be cultivated to considerable advantage on some of our low hills, not only for consumption in Assam, but also for the Calcutta market.

Gentianeæ.

Menyanthes, Linn.
Cristata, Roxb.

A curious aquatic plant with white flowers, found floating on still water.

Apocynaceæ.

Echites, Linn.
  855 Acuminata, Roxb.
  856 Caryophyllata, Roxb. ?
  857 Paniculata, Poir.
  858, 859, 860, Species.
Holarrhena, R. Br. *
  861 Villosa ?
Parsonsia, R. Br.
  862 Spiralis ?
Nerium, Linn.
  863 Coccineum, Roxb.
  864 Odorum, Roxb.
  865 Piscidium, Roxb.
Wrightia, R. Br.
  866 Antidysenterica, R. Br.
Alstonia, R. Br.
  867 Scholaris, R. Br.

Plumeria, Linn.
868 Acuminata, Roxb.
Tabernamontana, Linn.
869 Crispa, Roxb.
Strychnos, Linn.
870 Nux-vomica, Linn.
Ophioxylon, Burm.
871 Serpentinum, Linn.

These are all highly ornamental shrubs, small trees, or climbers, often with fragrant flowers. N. odorum, *Kudmi Kurmi,* I have found about temples and villages only. The bruised leaves, root, or whole plant of O. serpentinum is applied to swellings of the face, or of any other part of the body, and supposed to have good effect. It is called *Araksoon* by the Assamese.

Asclepiadaceæ.

Hoya, R. Br.
872 Carnosa, R. Br.
873 Macrophylla, Wight.
Marsdenia, R. Br.
874 Tinctoria, R. Br.
Pergularia, Linn.
875 Minor, H. K.
876 Species.
Calotropis, R. Br.
877 Gigantea, R. Br.
Hemidesmus, R. Br.
878 Species.
Sarcolobus, R. Br.
879 Carinatus, Wall.
Asclepias, Linn.
880 Amicata, Roxb.
881, 882, 883, Species.

Generally twining, milky, ornamental, free-flowering plants. C. Gigantea, *Akund,* I have seen about villages only.

Oleineæ.

Olea, Linn.
884 Dioica, Roxb.
Phillyrea, Linn.
885 Grandiflora, Wall.
Chionanthus, Linn.
886 Ramiflora, Roxb.
887 Zeylanica, Linn.
888 Macrophylla ?
Chondrospermum, Wall.
889 Smilacifolium, Wall.
890 Simplicifolium ?

Ornamental trees with minute flowers, generally more or less fragrant. The larger kinds produce good timber on the hills.

Jasmineæ.

Jasminum, Linn.
891 Bifarium ?
892 Bracteatum, Roxb.
893 Latifolium, Roxb.
894 Sambac.
Nyctanthes, Linn.
895 Arbortristis, Linn.

Ornamental, twining, flowering plants.

GYMNOSPERMÆ.

Equisetaceæ.

Equisetum, Linn.
896 Debilis, Roxb.
897 Species.

Very curious plants, *Harkola Bori*, found on the sandbanks of the Brahmapootra, and other rivers. The whole plant well pounded in water, is applied to bruises, or broken bones.

ENDOGENÆ.

Scitamineæ.

Zingiber, Gart.
898 Casumunar, Roxb.
899 Species.
Curcuma, Linn.
900 Zanthorrhiza, Roxb.
901 Species.
902 ———
Amomum, Linn.
903 Angustifolium, Linn.
Hedychium, Koen.
904 Angustifolium, Roxb.
905 Coronarium, Roxb.
906 Species.
Alpinia, Linn.
907 Calcarata, Rosc.
908 Galanga, Swzt.
909 Allughas, Rosc.
Costus, Linn.
910 Nepalensis, Rosc.
911 Speciosus, Rosc.
Globba, Linn.
912 Careyana, Roxb.
913 Expansa, Wall.

Herbaceous plants, often with elegant flowers, and stimulating roots. Ginger is not much cultivated in the plains, but is brought down in large quantities by the Nagas.

Marantaceæ.

Phrynium, Will.
914 Dichotomum, Roxb.
Maranta, Linn.
915 Arundinacea, Linn.
Canna, Linn.
916 Coccinea, Rosc.
917 Indica, Linn.

Very neat and useful mats are made of the stems P. dichotomum, *Patu Deo.* The Arrow-Root has lately be introduced.

Musaceæ.

Musa, Linn.
918 Paradisiaca, Linn.
919 Sapientum, Linn.
920 Coccinea, Andr.

Numerous varieties of the Plantain, *Kob,* are to be m with in Assam; a good assortment of the best (about 2 var.) have been planted in the Company's grounds at Nazer. and Gurgaon; the cultivation of them is also encouraged a each of the factories.

Taccaceæ.

Tacca, Forst.
921 Species.

A very curious plant, with dark coloured flowers.

Irideæ.

Pardanthus, Kerr.
922 Chinensis, Kerr.
Marica, Schreb.
923 Palmifolia ?

Pretty, flowering plants.

Bromeliaceæ.

Ananassa, Lindl.
924 Sativa, R. Br.

The Pine-apple, *Mattie Kanthal,* succeeds remarkably wel in Assam, but little care is taken in the cultivation of it.

Hydrocharideæ.

Damasonium, Schreb.
925 Indicum, Willd.
Valisneria, Linn.
926 Octandra, Roxb.
927 Alternifolia, Roxb.

Very curious aquatic plants.

Orchideæ.

Arundina, Blum.
928 Busifolia.
Vanda, R. Br.
929 Species.
Pterygodium, Swarzt.
930 Sulcatum, Roxb.

Curious herbaceous flowering plants growing on trees generally. To this tribe of plants belongs the celebratec

Vanilla aromatica, which has been sent me by Dr. Wallich and hitherto appears to do very well at Nazera. An extensive cultivation of this plant is highly desirable.

Palmæ.

Corypha, Linn.
931 Elata, Roxb.
Calamus, Linn.
932 Fasciculatus, Roxb.
933 Hostilis, Wall. ?
934 Rotang, Willd.
Borassus, Schreb.
935 Flabelliformis, Linn.
Areca, Linn.
936 Catechu, Linn.
937 Gracilis, Roxb.
Wallichia, Roxb.
938 Caryotoides, Roxb.
Caryota, Linn.
939 Urens, Roxb.

The most conspicuous plant among the Palms, is A. catechu, *Tamool*, the nuts of which the Assamese eat a tremendous quantity in a green state, with their *Pan*. The tree is used for ridge poles and rafters. Corypha elata has been introduced from the Botanic Garden. There are two plants of B. flabelliformis near the Gobinda Dole at Gurgaon; a few Cocoanut trees are occasionally to be found in villages. At Jorhath there are two Date trees, but I believe they never bear fruit. As an useful plant, C. Rotang, *Jatti Bet*, is second to none but the Bamboo; to the Assamese it is every thing in the way of line, cordage, wire and nails. The leaves of all the Palms are used for thatching, and those of a species of Livistonia, called *Toko pat*, are preferred for *Jhappeis* and *Syes*, or pats and covers to boats.

Liliaceæ.

Asparagus, Linn.
940 Racemosus, Willd.
Dracæna, Linn.
941 Ferrea, Linn.
942 Maculata, Roxb.
Aloe, Linn.
943 Perfoliata, Linn.

A. Racemosus is an ornamental twining plant, common; the other three I have seen about villages. The common Asparagus would no doubt do well here, and be much more productive than in Bengal.

Pontedereæ.

Pontedera, Linn.
944 Vaginalis, Roxb.
945 Hastata, Roxb.
946 Dilatata, Roxb.

Succulent plants with blue flowers, growing in water, o in wet places, called *Meteka* by the Assamese, who take th fleshy part of the root with salt and pepper to expel phlegm

Commelineæ.

Commelina, Linn.
947 Bengalensis, Roxb.
948 Cespitosa, Roxb.
949 Communis, Roxb.
950 Erecta, Linn.
951 Scapiflora, Roxb.
8 other species, from No. 952 to 959.

Common weeds growing among grass in damp places generally with blue flowers.

Smilaceæ.

Smilax, Linn.
960 Macrophylla, Roxb.
961 Maculata, Roxb.
962 Ovalifolia, Roxb.

Curious, prickly, climbing plants, with numerous minut flowers.

Dioscoreæ.

Dioscorea, Linn.
963 Alata, Linn.
964 Globosa, Roxb.
965 Anguina, Roxb.
966 Dœmona, Roxb.
967 Pentaphylla, Linn.
968 Rejbella, Roxb.
969 Fasciculata, Roxb.
970 Pulchella, Roxb.
7 other species, from 971 to 977.

Curious twining plants, with large, fleshy, edible tuber *Yams*, *Alloo.*

Roxburghiaceæ.

Roxburghia, Dryan.
978 Viridiflora.

A curious twining plant, with green flowers.

Pandaneæ.

Pandanus, Linn.
979 Fœtidus, Roxb.
980 Odoratissimus, Linn.
981 Lucidus, Wall. ?
982 Species.

Very curious, thorny plants, *Bhihibo kaint.* The leave are used for thatching.

Aroideæ.

Arum, Linn.
983 Orixensis, Roxb.
984 Colocasia, Willd.
985 Fornicatum, Roxb.
986 Bulbiferum, Roxb.
4 other species, from 987 to 990.

Herbaceous plants, often with fleshy, edible tubers. The common *Koshoo* of the natives, who eat the young tender leaves as well as the roots.

Pistiaceæ.

Pistia, Linn.
991 Stratiotis, Linn.

A curious aquatic plant, found floating on still water. *Pora.*

Gramineæ.

Of this Family, 61 species, from 995 to 1055.

This includes all the grasses, bamboos, and rice. As I have but few Botanical books by me, I cannot now undertake the grasses, sedges, and ferns, either to name them or to write any thing that would be satisfactory about them; even if I had books, I have not time. So far as the Company is concerned, it may be sufficient if I assure the directors, that there is plenty of the best kinds of grasses; bamboos in the greatest abundance, and rice of excellent quality, procurable to any amount, by making proper arrangements. It is certainly unnecessary for the Assam Company to go to the expense of growing rice, or of sending it into the province.

Cyperaceæ.

Of this Family, 3 species, from 1056 to 1087.
Of the Genus *Cyperus* and of *Scirpus*, 7 species, from 1088 to 1094.

These are all Sedges, or sedge-like plants, growing for the most part in wet ground or water, and not of much importance, save being very troublesome weeds in all cultivated ground, during the rains. One species, *Kyhori*, produces an edible root, which is dug out of the ground in November, and eagerly eaten by the children.

ACROGENÆ.

Filices.

Of Ferns, 29 species, from 1095 to 1123.

Among these the gigantic Tree-fern, very fine specimens of which may be seen growing on the banks of the Desangabore Borehath, and on the banks of the Booree Dihing above Jeypore. The young, tender, unexpanded leaves of all Ferns, *Dekia*, are invariably eaten by the Assamese, as *Dekia Hak*.

Lycopodineæ.

Lycopodium, Linn.
1124 Phlegmarium, Roxb.

A curious parasitical ? plant, found on the trunks of old trees.

Characeæ.

Chara, Linn.
1125 Furcata, Roxb.
1126 Virticillata, Roxb.

Very curious aquatic plants, growing in stagnant water.

Miscellaneæ.

Of these, 94 unarranged Species, from 1127 to 1220.

Among them, 1131, Nama zeylanica, a curious plant with pretty blue flowers, found in rice-fields in the cold season; 1133, Malachra capitata, introduced from the Botanic Garden, and 1207, Ailanthus species, having a very strong smell of garlic.

The above may be considered as nothing more than a list of specimens of Assam plants *now* in my Herbarium; the whole of which, together with a more extensive collection from the vicinity of Calcutta, have this day been despatched to Major F. Jenkins, for Sir W. J. Hooker, Superintendent of H. M. Gardens, at Kew.

J. W. MASTERS.

Nazera, 19*th June*, 1843.

On the Fertilizing Properties of the Well-Water of Calcutta.

By J. W. LAIDLAY, ESQ.

Whilst the attention of agriculturists in Europe has been directed, with the greatest advantage, to the chemical constitution of soils, there is an analogous branch of enquiry, which, in a special manner, demands the studious attention of the tropical cultivator; I refer to the quality of the water employed for irrigation. In India, the culture of entire districts depends upon an ample supply of this essential element; and though there may not always be room for selection, especially on the large scale, yet cases do occur, particularly in horticulture, where we have the opportunity of preferring a water suitable to our purposes, as well as rejecting one which may be deemed pernicious. And it is to this point that I would for a few moments solicit the attention of the Society.

The researches of modern chemists have rendered it all but certain that the fertility of soils depends essentially upon the quality and amount of their saline contents; and that the earthy constitution of a soil may vary very considerably, without materially influencing its capacity for sustaining vegetable life, provided its saline contents be such as are requisite for the perfect development of the plant. Nor is such saline matter to be considered, as but a few years since it was a mere accidental constituent of the vegetable organism; for not only have different plants their own several preferences for different inorganic salts, but the various parts of the same plant exhibit their peculiar preferences in a manner so marked and uniform, as to leave no room to doubt that they do so in obedience to a fixed law of their constitution. Thus, wormwood abounds in salts of potash; salsola kali in those of soda; the stalk of wheat and other cereals abound in silica, which is scarcely to be detected in the grain; and the grain invariably contains a notable amount of phosphate of lime of which none, or but faint traces are discoverable in the mature stalk.*

It follows from these facts, that a soil capable of bringing plants to perfection must contain all the saline matter requisite for their constitution, precisely as the *food* of animals contains every earthy substance essential to the bony structure of the latter: a conclusion abundantly confirmed both by the analyses of soils remarkable for the production or the rejection of particular plants, as well as by direct experiments, like those of Wiegmann and Polstorf, on the vegetation of plants in soils destitute of the requisite salts; in which case they lived, at least for a time, but never attained maturity, rarely putting forth blossoms, and never seed.

In European climates, where the fall of rain is very much less than in the tropics, and diffused over the whole year instead of being restricted to a few months, the soil is much more likely to retain its soluble salts for a lengthened period than in this country, where the rain falls in deluges and thoroughly lixiviates the soil, especially where its texture is porous, and the substratum sandy. Hence the extreme rapidity, remarked by every observant agriculturist, with which the loamy deposits of the Ganges and other inundating streams lose their fertility if not overflowed for some years. Fields, which for a time bore luxuriant crops of indigo, and other plants greedily abstracting salts of potash or soda from the soil, becoming thus exhausted of this essential food by the drenching influence of the periodical rains, refuse to yield sustenance to useful crops, and are abandoned to wiry grasses abounding in silica, till a higher inundation restore for a time their wasted energies by a fresh supply of saline matter, as well as by causing the destruction, and promoting the decay of such organic matter as they may contain.*

---

* The phosphates in the ashes of the *grain* of wheat amount to 76.5 per cent. (Saussure); in the stalk to 2.3 (Berthier). The silica in the former to 1.9 (Thon), and in the latter to 71.5 (Berthier).

It is an easy inference from these considerations, that the valuable saline contents of a soil must in time be transferred from the surface to the subsoil, whence they find their way into wells, and may be thence restored to the surface by irrigation. This, in fact, is what is constantly done in our gardens; but not in general, I am led to believe, from choice, or from the consideration that a Well may thus be made a permanent source of fertility, but because the water of tanks or of running streams may not be available for the purpose: for I am informed by our excellent Assistant-Secretary, Mr. Blechynden, that the prejudices of most people, and especially of native gardeners, are against the use of well-water, the soft and comparatively pure water of tanks being in general preferred, where it can be obtained. But this preference is not in consistence with the principles taught by the illustrious chemist of Giessen; and still less suitable is the water of tanks abounding in aquatic plants, which is of course thoroughly deprived of its salts by the latter; and however fitted for most manufacturing purposes by their agency, is in the same ratio rendered less valuable in horticulture.

Impressed with the importance of this subject, I have attended with great care to the progress of my own garden, which, since the rains, has been entirely irrigated with well-water containing a notable amount of inorganic salts; and I think I can observe a decided increase in the energy of vegetation as the restoration of the salts begin to tell upon the soil. The water of this well contains in 10,000 parts the following saline ingredients, all of which may be regarded as highly promotive of vegetable health.

---

* Some water taken from the river opposite Hooghly, in September last, being allowed to settle for some weeks, gave from 5000 grs. 1.06 of solid matter, of which 0.75 consisted of silica and carbonates of lime and magnesia; and 31 soluble matter, chiefly sulphates and chlorides.

Silica,	Grains	0.36
Carbonate of Lime,		3.25
Carbonate of Magnesia,		0.68
Sulphate of Lime,		3.65
Sulphate of Soda,		3.36
Sulphate of Magnesia,		1.04
Chloride of Sodium,		6.94
Chloride of Magnesium,		2.04
Chloride of Ammonium,		1.44
Nitrate of Magnesia,		1.77
Phosphate of Lime,		a trace.
Oxide of Iron,		a trace.
		23.93

So that by the constant use of such water a very considerable amount of liquid manure is applied daily, in the most gradual and efficacious manner, to the soil.

It is probable, that the well-water of Calcutta and its neighbourhood may coincide qualitatively with the above: the amount of saline matter will differ a little from local circumstances, the season of the year, and the amount of water daily withdrawn. But in the alluvial soil of this neighbourhood there need be no apprehension of any thing pernicious to vegetation in their contents. In the native parts of the town the well-water will be found to be affected by the neighbourhood of manufactories, or godowns for salt or saltpetre. Thus, a well in the neighbourhood of the Burra Bazar, contained in 10,000 parts,

Nitrate of Potash,	16.57
Other Nitrates and Chlorides,	10.10
	60.43

In conclusion, I would strongly recommend such as have hitherto employed tank-water for the irrigation of their gardens, to make a comparative trial of well-water. If the saline contents be similar to those stated above, it will certainly prove beneficial to the soil; and if the soil be naturally of a good texture, art can perhaps do little more to promote its fertility, than offer a more abundant supply of phosphates and organic extract, if it be not already present. The former may be conveniently supplied by the wood ashes of the cook-house; a valuable manure, generally dismissed in the Conservancy carts.

Note on the cultivation and preparation of Madder. By a Member of the Society.

In Holland, Madder is grown in a *very light sandy* soil, as free from stones as possible, and the roots are allowed to remain for three years, before they are removed.

The tops of the plants during the winter are covered over with a little earth, and in the early spring new shoots come up, which are again in the following winter covered with earth. In three years the roots attain to perfection, they are then carefully ploughed up, and having all the earth removed from them are placed on shelves over stoves to dry, which being finished, the outer bark and smaller roots are removed, ground up, and packed under the name of "Mull." The second process removes the next layer of root which, after it is ground, goes by the name of "Gamene." The third, or last process, is alone pounding up the pith which contains the finest coloring matter of all; this is called "Crops." Occasionally, however, after the "Mull" has been separated, the remainder of the roots are ground up, and go by the name of "Ombro." All the operations of grinding and packing are performed during the night, as light injures the color.

Berthollet in his Elements of the Art of Dyeing, mentions two or three different ways of preparing madder, the most simple of which is the following :—

" The roots are dried in the air on a paved floor, or on a hurdle. They are stirred about with a fork, and slightly beat, in order to separate the epidermis and the earth. What remains on the ground, composed of earth, epidermis, and small roots is sifted, and that left on the sieve forms what is called " Billon," common madder, which is fit only for dull colors. The roots of madder thus picked are ground, either under a stone mill, or under knives similar to those of a bark mill. By means of Fanners or a Boulter, there is separated, after a first milling, the madder called " Non Robée."

It is composed of a residuum of earth, epidermis and bark. After a second milling what is separated is called " Mi Robée." Finally, after a third milling the " Madder Robée" is obtained, which is of the best quality. The " Mi Robée" is preferable however, when it comes from somewhat thick roots.

When milling is performed for one's own use, only one quality is made ; or if a very brilliant colour is wanted, the worst quality is separated by a first grinding, and the product of the second is employed. This is called " Grappier."

Further correspondence connected with the Government Experimental Cotton cultivation at Dacca.

(Communicated by the Government of Bengal.)

To J. Dunbar, Esq., *Commissioner of Dacca.*

Sir,—I have the honor to submit to you, for the information of His Excellency the Governor General of India, the monthly report of my proceedings for the month of May.

In the early part of this month, after forwarding a part of the choppers required at the Government Farm, and engaging grammees to proceed to Toke to erect the huts, I went to Narraingunge, and took with me the seven packages of Cotton seed which I received from you, and after sending two small bags of it to J. P. Wise, Esq. to be forwarded to Phoolbarriah and Manickgunge, and also taking what was required for the present sowing, I put the remainder in *culsis*, after having it properly dried in the sun, and then secured it from the air, and hung it up in smoke as the natives do; this I hope will keep it sound until it is required. The American kind appears to be very good, but I am sorry to say that about half of the Bourbon kind is quite rotten; however a part of it I think is still good. From thence I proceeded to Toke, and commenced, on the 16th, putting up the huts, and I have now nearly twenty-five of them finished, which is all I intend putting up here at present for coolies. I have reserved the remaining twenty-five of the fifty that I engaged, for the Farm to be settled in the southern part of the district.

I did not succeed in getting any coolies until the 20th; on which day four came and offered their services, but since that time they have increased in number daily, and now have in all twenty-one. I have had them engaged in clearing off jungle and preparing land for seed, some of which I will be able to plant in a day or two.

I have had a great deal of trouble in getting ryots to plough for me, being all very busy with their own paddy crop; but on the 25th I succeeded in getting seven, and have had from eight to ten every day since, so that I now hope to get on well, as my difficulties are by degrees disappearing.

I am much in want of a horse, as the American system of cultivation being new to the natives of this country, I am obliged to be constantly moving about the plantation. I would also beg leave to recommend, should it meet with your approval, that the Farm should be supplied with twenty head of bullocks, so as to have ploughs of our own when required, instead of waiting until the ryots have finished their own lands before we can cultivate; besides their stock are so small, that they only scratch the land instead of ploughing it. If allowed, I think I could purchase in Capassia, stock that would answer our purpose at present.

With this Report you will please receive the monthly accounts for the Ryotee and Neej cultivation.

I have, &c.
(Signed) J. O. Price,
Dacca, 31*st May*, 1845. *Govt. Cotton Planter, Dacca.*

Sir,—I have the honor to submit to you, for the information of His Excellency the Governor General of India, the monthly report of my proceedings for the month of June.

2nd. On the 1st of this month, I planted about two beegahs of land on the Government Cotton Farm, with acclimated American seed, which vegetated very quickly, and is now about eight inches high, and looking very healthy; I also planted some on the 4th, 10th and 17th instant, all of which looks well, but I regret to say the constant rains we have at present, will neither admit of weeding or moulding as it should be done; however it has not yet suffered any thing of any consequence, and I hope we will soon have a few dry days to clean and mould it, as well as to prepare land for further planting. I have only been able to plant about six beegahs this month, which was all I could get ready, not having been able to obtain coolies to prepare land sooner, besides the weather has been very unfavourable for planting; but should it admit of my doing so, I hope to be able to plant from thirty to forty beegahs in all July; some of the seed that I have distributed in different quarters of this district, I am happy to say, I have been informed, looks very promising.

3rd. The coolies have been engaged principally in *codalling* land for the July sowings, draining, making fences, clearing of jungle, &c. &c., and the grammees in erecting the huts necessary for the Farm.

4th. In the copy of a Government letter I had the honor of receiving from you in December last, accompanied with one from yourself, No. 451, it was stated that the Government of the North-West Provinces had been requested to transfer to Bengal, for my use, all the farming implements purchased for the use of the American Cotton planters, but now no longer required in that quarter, and Mr. Terry, the period of whose engagement expired in April last, would be directed to make over the implements in his possession belonging to Government. None of either having yet arrived, I take the liberty of mentioning the subject to you, as I have been informed that Mr. Terry, had two (hand) Saw-Gins in the implements he had, which I was in hopes would have been forwarded to this District, and particularly so as they would have been easily moved about from place to place; besides if left neglected for any length of time in this damp season, they will be of little or no use afterwards.

5th. I have received, through the kindness of G. D. Glass, Esq., three packages of Cotton grown at Betal, from seed that I gave him in December 1843; one part of it has been cleaned by the Native Churka, another by hand-picking, and the third remains unseparated from the seed; I would have liked very much to have had one of the Hand-Saw Gins, to have cleaned it with, so as to have been able to have compared the three staples together. I purpose sending a package of each to the Agricultural Society; the plants from which it was taken have been bearing for the last ten months, and still continue to do so.

I have, &c.
(Signed) J. O. PRICE,
Toke, Govt. Farm, June 30th, 1845. *Govt. Cotton Planter.*

To the Sudder Board of Revenue, Fort William.

GENTLEMEN,—In transmitting Mr. Price's Report for the month of July 1845, I have the honor to state, that about a fortnight since, on my way back from Mymensing, whither I had proceeded on circuit duty, I visited the Cotton plantation near Toke.

2nd. The rains have been so incessant in this quarter during the last two or three months, that Mr. Price has been able to plant but a very small portion of his lands; and from what I saw of the plant, I very much fear that a continuation of the extremely wet weather we have had, would inevitably destroy it. We have had more sunshine during the past week, and I would fain hope that the plant will come round again before long. Mr. Price has still a good supply of seed in hand, which will be committed to the ground when the weather has become settled enough to give hope of better success.

3rd. I shall take measures for procuring some Bullocks of the kind required by Mr. Price.

I have, &c.
Commr's. Office, Dacca Divn. (Signed) J. DUNBAR,
Dacca, the 8th August, 1845. *Commissioner of Revenue.*

SIR,—I have the honor to submit to you, for the information of His Excellency the Governor General of India, the monthly report of my proceedings for the month of July.

2nd. From the unusual quantity of rain that has fallen in this district, during this month and the latter end of the last, I have been prevented from being able to prepare any land for planting, (with the exception of about two biggahs, only a part of which I have been able to plant on account of the wetness of the land); I have been therefore obliged to confine my proceedings this month (with the few coolies, I have employed) in a great measure to ditching, which was very much required.

3rd. The cotton seed that I planted last month, and which I mentioned in my last report as being very promising, I regret to say, has suffered very much from the long continuation of the rains; indeed so much so, that a part of it will require to be planted over again as soon as the weather will permit of my doing so. The seed that I planted in the early part of last month still looks healthy, and I am in hopes will do well yet, although it has not grown an inch in all this month.

4th. I find on particular enquiry, that I will not be able to procure any bullocks in this neighbourhood, that would be of any service on the farm; those that the ryots would part with are either too old or have been surfeited from being overworked, and therefore would be equally useless to us as working stock. I have been informed by Indigo Planters, who are accustomed to buying stock, and well acquainted with this district, that if we want good stock at present we must get them from Patna. The cattle from that district being larger and stronger than those in this district, would be better adapted for the American plough, which I still hope to be able to introduce in this district. If we had about twelve head of those Patna stock for heavy work, I think they would be sufficient, as we should also have a few of the smaller kind to work the Bengal plough with; these we will be able to procure in Mymensing district in the month of November, which I am informed is the usual time of purchasing young stock for factories.

I have, &c.

(Signed) J. O. PRICE,
Govt. Cotton Planter.

Toke, Govt. Farm, July 31st 1845.

To the Sudder Board of Revenue, Fort William.

GENTLEMEN,—Herewith I have the honor to transmit Mr. Price's report for August 1845, which only came into my hands yesterday, in consequence of my absence at Backergunge, during the earlier part of this month.

2nd. As regards the cotton now in the ground at Toke and elsewhere, the report is very satisfactory. I am quite of Mr. Price's opinion, that for the present it will be better to confine the *neej* cultivation to the plantation at Toke. When the establishment there has been fully provided for in every way, it will be time enough to mark out another experimental farm, in the lower parts of the district; should it not be found in the interim that a *ryottee* cultivation is likely to be more successful. I have written fully upon this subject to Mr. Price.

I have, &c.

(Signed) J. DUNBAR,
Commissioner of Revenue.

Commr's. Office, Dacca Divn.
Dacca, the 27th September 1845.

SIR,—I have the honor to submit to you, for the information of His Excellency the Governor-General of India, the monthly report of my proceedings for the month of August.

2nd. The weather during last month having been much more favourable for planting than that of July was, I have been enabled to plant about twelve biggahs of land with American seed, which has all vegetated, and looks very healthy.

3rd. I have much pleasure in being enabled to inform you, that a great part of the land, planted in June, which you saw when you called at the farm, and which suffered so severely from the unusually heavy rains we had had, has now quite recovered, and is very healthy in appearance.

4th. In the latter part of this month I visited Phoolbarreah, for the purpose of examining the small patch of cotton I planted at that place. It is now about seven feet high, and covered with forms and small bowls, and promising to bear as abundantly during the ensuing dry season as it did during the last one. From thence I proceeded to Lucypore, at which place there is about a biggah of land, which was planted with exotic seed in May. I have not seen any cotton in this country of the same age more promising than this is, it is now from two to three feet high. On my return to Dacca, I also examined another place, at which there is some foreign cotton seed planted; which also appeared healthy.

5th. On my leaving Dacca, I proceeded to Naraingunge to examine the machinery, implements, &c. that had been received from Rungpore, and I regret to say that I found the two hand gins in very bad order; but after I have them properly cleaned and repaired, I will be better able to judge of the likelihood of their being of any service.

6th. Taking into consideration the difficulties we have had to contend with in establishing the farm, occasioned in the first place by the disappointment of not getting coolies from Government, and in addition to that the unusual quantity of rain that has fallen since May, I beg leave to state to you that I think it would be better to confine the experimental *neej* cultivation to this farm alone, at least for this year, so as to get it properly established before commencing on the one to the southward: and instead of the additional farm, I have the honor of agreeing with you in opinion that it would be advisable, as we are now sure of having good seed, to establish a *ryottee* cultivation on a limited scale. J. Wheler, Esq. Collector, has kindly offered to get ten biggahs planted in Hattia or Sundeep, and the same quantity at Chittagong.

I have, &c.
(Signed) J. O. Price,
Toke, Govt. Farm, Sept. 10th 1845. *Govt. Cotton Planter.*

Sir,—I have the honor to submit to you, for the information of His Excellency the Governor General of India, the monthly report of my proceedings for the month of September.

2nd. The weather in the early part of this month having continued favourable for planting cotton, the coolies on the farm were engaged in planting American seed up to the 7th; from which time the weather was so unfavourable for cultivation, that very little could be done in any way until the 21st. when it changed and became more favourable. The young plant has suffered very much from the long continuation of rain, accompanied with high winds. During the remainder of the month the coolies have been employed in moulding up the young plant, having been nearly washed out of root by the late rains; still I am in hopes it will do well, and that I may be enabled to report more favourably of it next month.

3rd. The seed planted in June having got sufficient strength to contend with the weather, has suffered very little, and is looking well.

I have, &c.
(Signed) J. O. Price,
Dacca, 17th October, 1845. *Govt. Cotton Planter.*

Monthly Proceedings of the Society.

(Wednesday, the 8th January, 1845.*)*

The Hon'ble Sir J. P. Grant, President, in the chair.

The minutes of the last general meeting were read and confirmed.

Members Elected.

The gentlemen proposed at the last meeting were duly elected Members of the Society, viz.

Lieut. E. H. Impey, Baboo Hollodhur Bhose, Messrs. Charles Sutherland and G. B. Robinson.

Candidates for Election.

Wm. Cragg, Esq., Junr., merchant, Calcutta, proposed by Mr. W. Storm, seconded by Mr. H. W. Lake.

Robt. B. Lake, Esq., merchant, Calcutta, proposed by Mr. H. W. Lake, seconded by Mr. W. Hammill.

Capt. Wm. Swatman, (Assistant Commissary-General), proposed by Mr. A. Sconce, seconded by Mr. F. Stainforth.

Major H. Delafosse, C. B., Artillery, proposed by Capt. F. C. Burnett, seconded by Mr. C. K. Robison.

Lieut. S. C. Woodcock, Artillery, proposed by Capt. Burnett, seconded by Mr. Robison.

Lieut. S. W. Stokes, Artillery, proposed by Capt. Burnett, seconded by Mr. Robison.

Lieut. H. Leg. Bruce, Artillery, proposed by Capt. Burnett, seconded by Mr. Robison.

Alexander Fraser, Esq., Civil Service, proposed by Mr. John Allan, seconded by Mr. W. Storm.

Election of Office-Bea

The President intimated that this being
it was necessary that the election of Offic
year should take place. He would beg to
cies had occurred in the list of Vice-Presidents, in consequence of the demise of Baboo Ram Comul Sen, and the resignation of Dr. Griffith and Baboo Dwarkanath Tagore, the former having left for Malacca, and the latter being about to leave very shortly for Europe.

The Members then proceeded to the election appointing Dr. Huffnagle and Mr. W. Storm the scrutineers, who reported the result to be as follows :—

Sir John Peter Grant, ***President.***

Sir Lawrence Peel, C. K. Robison, Esq, Rajah Radakant Deb, Baboo Ramgopaul Ghose,	*Vice Presidents.*

James Hume, Esq., *Honry. Secretary.*
A. H. Blechynden, Esq. *Depy. Secty. and Collector.*

Proposed by Mr. Wale Byrne, seconded by Mr. W. Storm, and unanimously agreed to,—

" That the thanks of the Society are eminently due to James Hume, Esq. as well for the zeal and ability with which the duties of Secretary to the Agricultural and Horticultural Society have been attended to, as for his disinterestedness in the gratuitous discharge of the duties of that office for the last two years."

Letters were read from Dr. Griffith and Baboo Dwarkanath Tagore, tendering their resignation of office as Vice-Presidents. Dr. Griffith observes, " my connection with the Society has given me a strong interest in all that the Society does or wishes to do, I trust therefore, that I may hope to be useful to it while at Malacca, or wherever I may be."

Proposed by the Secretary, seconded by Mr. Robison, and unanimously *resolved,*—

" That in consideration of the readiness evinced on every occasion by Mr. W. Griffith to assist the Society with his advice, as a Member, and in every other way within his province, as Officiating Superintendent of the H. C. Botanic Garden, the best thanks of the Society be given to that gentleman."

It was resolved to defer the revision of the Standing Committees till the next general meeting.

Annual Reports.

The Annual Report of work done by the Society during the past year was then submitted, and referred to the Committee of Papers. A Report from the Finance Committee for the year 1844, was also read, and the several statements connected therewith laid on the table.

East India Sugar Question.

The Secretary intimated that the Special Committee appointed by the Society to take into consideration the question of the duties on sugar, having previously recorded their sentiments, had a meeting on the 14th ultimo. He now begged to read the resolutions

which were passed at that meeting, and to submit the draft of a petition, founded thereon, to the two Houses of Parliament:—

"1st. That it is the opinion of this Committee that a petition be presented by the Society on the subject of East India sugars."

"2nd. That the object of the petition be, for a general reduction of duties upon colonial and free labour foreign sugars, retaining a proportionate difference, similar to the present, and for soliciting the removal of any restrictions upon refined sugars; also, for the continued exclusion of slave-grown sugars, and for an assurance that no change may immediately take place to the prejudice of colonial interests."

After some discussion in regard to the wording of certain paragraphs of the petition, it was proposed by the Secretary, seconded by Mr. Haworth, and resolved,—

"That a *special* meeting of the Society be held on Tuesday afternoon next, the 14th instant, at 4 o'clock, to receive and take the petition into consideration."

The Hon'ble the President gave notice that he would move, at the special meeting, that the following words in the resolutions be omitted, viz:—

"And free labour foreign sugars, retaining a proportionate difference, similar to the present"—and—"also, for the continued exclusion of slave-grown sugars."

Mr. Haworth gave notice that, at the same meeting, he would move that the words, "from British possessions" be inserted in the sixth paragraph of the petition, after the words "of any quality."

The following is the draft of the petition:—

TO THE HON'BLE THE COMMONS OF GREAT BRITAIN AND IRELAND IN PARLIAMENT ASSEMBLED:

The Petition of the Agricultural Society of India, which comprises 600 members.

Humbly Sheweth,

1*st*. That the cultivation of sugar throughout British India is considered so desirable, both for the Agriculturist and the Landowner, and the Mercantile interest, that it has already advanced in the face of very great obstacles, so as to form one of the great staples of agriculture and commerce; its cultivation could be carried out to an immense extent, if due protection is given to the planter, and which would result in a proportionate increase in the consumption of English manufactures in return.

2*d* Being fully alive to the important interests at stake, your petitioners crave that there may be a general reduction of the present duties upon colonial and free labour foreign sugars—retaining the present, or an equivalent differential duty.

3*d*. Your petitioners would earnestly urge the continued exclusion of slave-grown sugars.

4th. Your petitioners humbly pray for an assurance that no change will again be made in the duties, to the prejudice of colonial interests, within a stated period of some years.

5th. Your petitioners believe, that by a general reduction of duties on colonial and free-grown foreign sugars, keeping a moderate protecting difference in favour of the produce of British possessions, an increased consumption would immediately follow a reduction in the present rates of duty: both the colonial interest and the consumer would be satisfied, and most probably the revenue, from this source, would not be diminished, but, on the contrary, in the course of a short period, an increase of revenue might naturally be expected. The consumption of British manufactures would materially advance in this country, as it did during the last ten years, when the export of sugar from Calcutta was raised from 3,500 tons to 55,000 tons a year; and during the same time the increase in the import of cotton twist was about 7 million pounds weight, and 3½ millions of piece-goods, most of which, it is believed, was paid for in sugar; thus shewing that the production of sugar in India is worthy of every encouragement.

6th. Your petitioners also pray that the present prohibitory duty upon refined sugar may be taken off, as an act of justice to the colonial interest; and that refined sugar of any quality, whether crushed or in loaves, may be admitted on the same terms as other sugar. This having been allowed to a certain extent of late under a liberal interpretation of the law, still shipments of such are made under great uncertainty. The measure would be of great importance to all engaged in the manufacture of sugar, whether European or Native, the extra cost of obtaining a highly refined article, being very trifling beyond that required to bring the quality to the point now understood to be admissible. This boon would now enable the native growers to find a good market for all their *goor* and *khaur* sugars, the shipments of the latter being almost put a stop to, from the excessive drainage and deterioration on the voyage. The granting of this boon, it is believed, would not, in its effects, interfere with the financial arrangements of the state.

7th. Your petitioners beg earnestly to call the attention of your Hon'ble House to the fact of great efforts being now in progress, and that large investments of capital have already been made, with the view of improving the culture of the cane and the manufacture of its juice, by employing the best European machinery and skill; the result of which cannot yet be ascertained, although the present operations promise well. To enable parties to proceed with confidence in their endeavours to increase the production of sugar in this country, it is very desirable that the duties be fixed for a term of years.

8th. For the reasons set forth, your petitioners most respectfully submit to the favorable consideration of your Hon'ble House that the measures prayed are just and expedient.

And your petitioners will ever pray.

Notice of Motions.

The Secretary read a communication from Mr. L. Wray, alluding to the circumstance of his having completed his treatise entitled the "Sugar Planter's Companion," which has been published in the Society's Journal, and submitting whether the work be not deserving of some consideration at the hands of the Society; whereupon, the following notice of motion, for next meeting, was given by Mr. Storm, seconded by Mr. Speede:—

"That on the grounds set forth in Mr. Wray's letter, the Society's gold medal, and 500 rupees, be awarded to Mr. Wray for his work, 'the Sugar-Planter's Companion,' which has been contributed to the Society's Journal."

Mr. C. K. Robison also gave the following notice of motion for next meeting:—

"That the present hour (half-past nine A. M.) for the monthly meetings of the Society, being inconvenient for the attendance of the native members, it be changed in future, from that hour, to 4 o'clock in the afternoon."

(Tuesday, the 14th of January 1845.)

SPECIAL MEETING.

Baboo Ramgopaul Ghose, Vice-President, in the Chair.

Present.

Messrs. W. F. Fergusson, Wm. Haworth, H. W. Lake, W. C. Braddon, J. W. Roberts, J. W. Carter, Baboo Huraynarain Day, and James Hume, Honorary Secretary.

The Secretary read a letter to his address from the President, intimating his regret that indisposition prevented his attendance at the meeting, and stating his reasons for proposing at the general meeting the omission of certain clauses in the petition. These were, firstly,—that exclusion of slave-grown sugar by prohibitory duty was hopeless, that it was beyond the power of the legislature, or even to prevent the encouragement given to its growth by the consumption of Great Britain, since the space left in foreign countries by the free-grown sugar consumed there would be instantly filled by slave-grown sugar for the supply of those countries. Secondly,—That the direct encouragement thus given to the importation of slave-grown sugar into countries abroad, in lieu of, or in competition with free-grown foreign sugar, will keep down the price of the latter, and enable it more effectually to contend with British Colonial sugar in the Home market. Thirdly,—That whether these views were correct or not, they were too important and required too much political knowledge as well as theoretical consideration, to make it advisable for the Society to pledge itself to an opinion; and lastly, that, expressing its earnest wish to discourage the employment of slave labour and its gratitude to Providence that no such outrage against human happiness and virtue as result from predial slavery, existed in the British dominions in India, the Society should confine itself to the manifest advantages that would result to those dominions, to the mother country, and to the improvement of the wealth, comfort and happiness of the agricultural labourers of India, from securing Indian sugar on the same footing of protection with that produced by other colonies of the empire, leaving it to Parliament to deal with the question of foreign slave-grown sugar as in its wisdom it should deem expedient.

The Secretary next read a minute by Mr. Willis a member of the Special Committee (written after the preparation of the draft petition), strongly dissenting from the proposed petition, on the ground that there is no protection in seeking to uphold a measure of monopoly, that such protection is not shewn to be wanted and that it is altogether repugnant to free trade. Mr. Willis thinks that it would rather be "better to petition for as early an equalization of sugar duties from all countries as is possible, and as is compatible with some respect to the many interests which have unfortunately arisen in all our colonies during the age and system of monopoly protection."

The following are the resolutions objected to, and the words in italics were the proposed omissions:—

"That the object of the petition be for a general reduction of duties upon colonial *and free labour foreign sugars, retaining a proportionate difference, similar to the present,* and for soliciting the removal of any restrictions upon refined sugars; *also, for the continued exclusion of slave-grown sugars,* and for an assurance that no change may immediately take place to the prejudice of colonial interests."

After some discussion, in which all the members, with the exception of the Secretary, expressed themselves favorable towards the principles involved in the petition, Mr. Haworth proposed, and Mr. Braddon seconded the following resolution:—

"That the sugar petition as it now stands be approved and sent forward, and that the words, "from British possessions," be added to the sixth clause after the words "of any quality."

With the view, if possible, of avoiding the expression of any difference of opinion in the Society, on an occasion when unanimity was so desirable, Mr. Fergusson suggested the following as an amendment to the second clause objected to:—

"Your petitioners crave that there may be a general reduction of the present duties upon colonial and free labour foreign sugars, retaining an equivalent differential duty similar to the present *between colonial and foreign sugar,*" and the omission of the third clause altogether:—

"Your petitioners would earnestly urge the continued exclusion of slave-grown sugar."

This amendment being put, met with no support. The original resolution was then put and carried.

It was then proposed by Mr. Fergusson, seconded by Mr. Lake, and carried, "That the petition be sent to the E. I. and China Association, and that they be requested to entrust it to such parties as they consider to take the greatest interest in the matter."

(*Thursday, the* 13*th of Feb.* 1845.)

C. K. Robison, Esq., Vice.-President in the Chair.

The proceedings of the last general meeting, and of the special meeting on the 14th January, were read and confirmed.

Members Elected.

The gentlemen proposed at the last general meeting were duly elected members of Society; viz.,

Messrs. Wm. Cragg, R. B. Lake, and Alexander Fraser, Capt. W. Swatman. Major Delafosse, Lieut. S. C. Woodcock, Lieut. S. W. Stokes, and Lieut H. Leg. Bruce.

Candidates for Election.

The names of the following gentlemen were submitted as candidates for election:—

John Panton Gubbins, Esq. Civil Service, proposed by Mr. John Allan, seconded by Mr. Wm. Storm.

W. A. Rolfe, Esq., Medical Service, proposed by Mr. Robert Watt, seconded by the Secretary.

G. L. Young, Esq., Ballacole Factory, Pubna, proposed by Mr. Wm. Storm, seconded by the Secretary.

Brian Hodgson, Esq., Civil Service, proposed by Dr. Huffnagle, seconded by Mr. Balfour.

C. C. Bruce, Esq., proposed by Mr. Wale Byrne, seconded by Dr. Huffnagle.

Baboo Debendernauth Tagore, proposed by Baboo Ramgopaul Ghose, seconded by Dr. Mouat.

Baboo Nursingchunder Bose, proposed by Baboo Ramgopaul Ghose, seconded by Dr. Mouat.

Baboo Nobinchunder Bose, proposed by Baboo R. G. Ghose, seconded by Dr. Huffnagle.

Baboo Hemnaut Roy, proposed by Baboo R. G. Ghose, seconded by Mr. W. Haworth.

Presentations to the Library.

1. Journal of the Asiatic Society of Bengal, Nos. 66. and 67.—*Presented by the Society.*

2. Calcutta Journal of Natural History, No. 20.—*Presented by Dr. McClelland.*

3. The India Journal of Medical and Physical Science, No. 12 of vol. 2, and No. 1 of vol. 3.—*Presented by Dr. Finch.*

GARDEN AND MUSEUM.

1. A large supply of the white sweet potatoe (*Sukerkund aloo*) from Sumbulpore.—*Presented by Lieut. Col. J. R. Ouseley.*

2. A large supply of yams from Rangoon, called by the Burmese, *Thadway-oo.*—*Presented by Capt. Wm. Spiers.*

Capt. Spiers sends this supply under the impression that this yam is unknown in Bengal, as he has no recollection of having seen it here. It is however, known, though not in common, in the Calcutta bazars, as the Tenasserim yam; it is very superior in flavor to the generality of yams.

3. A further quantity of the tubers and dried specimens of the *Tacca pinnatifida* from Chedooba Island.—*Presented by Major D. Williams.*

The Secretary mentioned he was indebted to Dr. Wallich for the name of this plant, of which a few tubers, and a farinaceous powder prepared therefrom by the Mugs were presented by Major Williams at the meeting in December last. Mr. Speede reports that in external appearance, this powder is similar to that of the true arrow-root; that it is clear and well-manufactured, but far inferior in strength to the arrow-root, requiring at least twice the quantity that is necessary of the latter to make the same strength of jelly. He is, therefore, of opinion that the article would be unprofitable for this market, unless it can be produced at a much lower rate than arrow-root.

4. A few seeds of the Theobroma cacao and a specimen of tea-seed oil extracted by heat.—*Presented by Capt. A. Charlton.*

Captain Charlton mentions that this oil is used in China for culinary purposes, and as lamp oil, and is said to be efficacious as an embrocation for gouty and rheumatic complaints, and he adds, ' the *best* oil is extracted by what is usually termed the cold-drawn process. The seeds are separated from the capsules, and put into the sun, till the outer brown cuticle which envelopes the kernel admits of being easily detached. They are then crushed and the oil expressed. A picul of fresh seed is said to yield about 25 catties of oil. Many maunds of seed, I recollect, decayed upon the ground annually in Assam. I should think it would be advantageous to use them for extracting oil."

5. A few specimens of Chinese manures and seeds; the latter consisting of a species of millet, two kinds of beans, oil, and varnish nuts, and seeds of the medick or trefoil.—*Presented by Dr. Alexander Grant.*

6. A small box of seeds from Barbadoes, containing among other kinds, a few seeds of the scarlet cordia, soursop, scarlet bean

tree, duranta ellisii, and of the logwood tree.—*Presented by B. J. Colvin, Esq.*

7. Half a mound of *gurjun-tale*, or wood-oil, from Arracan.—*Presented by Lieut. W. F. Nuthall.*

Lieutenant Nuthall mentions that this oil is procured from a tree called by the Mugs *Kow-gyan*; a specimen of it is included in the large assortment of woods which he lately forwarded to the Society. Many thousand maunds of the oil, Lieut. Nuthall adds, could be procured upon a demand, and at about three rupees per maund.

8. A large quantity of acclimated American maize of the "yellow gourd," flint corn" and "sugar" varieties, and about a hundred lavender seedlings—*From the Society's Nursery Garden for distribution.*—Though grown out of season, this maize is almost equal to the original stock in length and thickness.

Revision of Standing Committees.

The revision of the Standing Committees was the subject that first engaged the attention of the meeting. The Secretary mentioned that the departure of Mr. Griffith had occasioned a vacancy in the Garden Committee and Committee of Papers, which it would be necessary to fill up; both these Committees, as also a few others, required strengthening, and he therefore begged to submit the names of the following gentlemen for that purpose:—

For the Sugar Committee, in addition,—Messrs W. Haworth and S. H. Robinson.

For the Committee on Coffee and Tobacco, in addition,—Messrs. W. Storm and C. K. Robison.

For the Committee of Implements of Husbandry and Machinery, in addition,—Mr. H. Mornay.

For the Nursery Garden Committee, in the room of Mr. Griffith, —Mr. W. G. Rose.

For the Fruit and Kitchen Garden Committee, in addition,—Mr. Rose.

For the Committee of Papers, in the room of Mr. Griffith, and the late Mr. Bignell,—Dr. Huffnagle, Mr. C. R. Prinsep, and Mr. J. W. Laidlay.

The General Committee was removed from the list as no longer necessary under the present arrangement. It was proposed by Dr. Huffnagle, seconded by Dr. Mouat, and resolved, that the following committees, as revised, be the Standing Committees for the current year:—

Sugar.—Messrs G. U. Adam, John Allan, H. Piddington, James Cowell, Wm. Haworth, and S. H. Robinson.

Cotton.—Messrs Joseph Willis, Charles Huffnagle, W. Earle, G. U. Adam, and Robert Smith.

Silk, Hemp, and Flax—Messrs R. Watson, J. Willis, C. K. Robison, and G. T. F. Speede.

Coffee and Tobacco.—Dr. Strong, Messrs H. Piddington, W Storm, and C. K. Robison.

Implements of Husbandry and Machinery.—Col. Forbes, Messr C. K. Robison, Charles Huffnagle, H. Mornay, and Rajah Radhakant Deb Bahadoor.

Oil and Oil Seeds.—Dr. Mouat. Messrs Wm. Haworth, H Mornay, James Cowell, John Allan, H. C. Kemp, and Baboo Ramgopaul Ghose.

Grain Committee.—Messrs Joseph Willis, Wm. Storm, Charle. Huffnagle, John Jenkins, Wm. Haworth, C. R. Prinsep, G. T, F Speede, and Baboo Ramgopaul Ghose.

Improvement of Cattle—Messrs Charles Huffnagle, C. R. Prinsep, W. P. Grant, C. K. Robison, and Wm. Storm.

Nursery Garden Committee—Messrs Wm. Storm, R. Dodd, H W. Lake, T. H. Lakin, and W. G. Rose.

Fruit and Kitchen Garden Committee.—Messrs Wm Storm H. Piddington, G. T. F. Speede, R. Dodd, and W. G. Rose.

Committee of Papers.—Dr. Mouat, Messrs Charles Huffnagle, J W. Laidlay, and C. R. Prinsep.

Finance Committee.—Messrs Charles Huffnagle, and M. S. Staunton.

DISPOSAL OF MOTIONS.

The "Sugar Planter's Companion."

The motion, of which notice was given at the last meeting by Mr. W. Storm, "that, on the grounds set forth in Mr. Wray's letter, the Society's gold medal, and 500 rupees, be awarded to Mr. Wray, for his work, "the Sugar Planter's Companion," which has been contributed to the Society's Journal," was brought forward. After a little discussion, it was agreed to refer the question for report to the Sugar Committee, and Committee of Papers, conjointly.

Temporary Change in the Hour of General Meetings.

The other motion, of which notice was also given at the last meeting by Mr. Robison, "That the present hour (half past nine A. M.) for the monthly meeting of the Society, being inconvenient for the attendance of the Native Members, it be changed, in future, from that hour, to 4 o'clock in the afternoon"—was next brought forward.

Baboo Ramgopaul Ghose submitted a circular, which he had addressed to the native resident members on the above subject. It had been signed by about a dozen members, who concur in opinion, that the proposed change of hour would be much more convenient to them, and admit of their attending the meetings of the Society. After some little discussion, it was proposed by Mr. Robison, seconded by Dr. Huffnagle, and agreed, that the Society meet at 4½ P. M. and 9½ A. M. alternately, till further notice, the first meeting to be at 4½ o'clock.

Horticultural Exhibition.

A list of native gardeners, to whom money prizes to the extent of 80 rupees, and four medals, were awarded at the show of vegetables and fruits, held on the 15th January, was next submitted. In the remarks appended to the list, it is mentioned that upwards of 200 *malees* attended the show. As respects European vegetables, this was considered an excellent exhibition. The display of brocoli, American squash, endive, Scotch kale, and Windsor beans—vegetables seldom seen at former exhibitions, or in very small quantities—was very good. There were also several fine specimens of American flat turnip, early York and red cabbage, coss lettuce, carrots of sorts, spinage, beet, and potatoes. The cauliflowers were indifferent, the heads wanting compactness; and of peas, there were only two or three good baskets. The celery was of good colour, but not firm.

The assortment of indigenous vegetables was limited; but there were some good specimens of Assam bean, Tenasserim yam, cucumber, and maize.

Under the head of fruits, several specimens of pomegranates, sapotas, guavas, and papeeahs, were exhibited. Prizes were given for baskets of green mangoes, custard apples, pine apples, and rose apples, as they were produced out of season; also, for oranges grown in the neighbourhood of Calcutta, and for a single soursop.

Nursery Garden.

A report from the Garden Committee was read. The Committee announce the completion of the additional work which has been in progress during the last six months—viz, the thorough trenching of about 15 beegahs of ground, the formation of a main and branch walks, &c. They allude to the planting out of 8 beegahs of land with Otaheite cane, to meet a probable large demand next season, the supply this season having been very insufficient. They refer to the circumstance of Dr. Wallich having agreed to recommend to the Government the proposed extension of the present allotment, and to the steps which have been taken to procure supplies of fruit trees from various quarters. The committee close their report with a few suggestions regarding the better protection of the boundary, &c.

At the close of the perusal of the above report Captain Munro observed that he had lately visited the Nursery, and thought it would be better to bring the allotment, now under charge of the Society, into a higher state of cultivation, before applying for an additional piece of ground: whereupon, the Secretary remarked that the recommendation originated with Mr. Griffith, the late Officiating Superintendent of the Botanic Garden, and was fully approved of by the other members of the Committee. The possession of a larger piece of ground would admit of portions of the present allotment lying fallow, and this was one of the principal objects the Committee had in view in preferring the suggestion.

Resolved,—That the report of the Committee be confirmed, with the exception of the proposal of leasing out the tanks.

Sugar-duty Petition.

The Secretary informed the Members that, in accordance with the resolution of the *special* meeting, he had forwarded the petition on the Sugar Duty question, to the Secretary of the East India and China Association, by the January mail, accompanied by the following letter:—

To J. STIKEMAN, ESQ., *Secretary E. I. and China Association.*

SIR,—I have the honor to annex, for the information of the East India and China Association copy of a resolution which was passed at a special meeting of the Agricultural Society of India, held on the 14th instant, to take into consideration the draft of a petition to Parliament on the sugar duty question.

In conformity with that resolution, I beg to advise you of the despatch, by the present mail, of two copies of the petition for both Houses of Parliament, and doubt not the East India and China Association will undertake to "entrust them to such parties as they consider to take the greatest interest in the matter." At the same time, I think it proper to mention, that a difference of opinion exists among the members of the Society in regard to this petition. The limited time allowed for its circulation has not admitted of its being sent to all the *resident* Members, amounting to 180; it has been seen by about 103 persons, of whom 78, you will observe, have signed it. Among the number of dissentients, I may observe, are the President, Vice-Presidents, and Honorary Secretary of the Society.

I have, &c.,
(Signed) JAMES HUME,
Honorary Secretary.

January 22nd 1845.

Vernacular Hand-book of Agriculture, Horticulture, and Farming.

The Secretary brought to the notice of the Meeting a manuscript work, in the Ordoo language, and Persian character, on Agriculture, Horticulture, and Farming, which had been submitted at the meeting in September last, to compete for the prize offered by Mr. H. C. Tucker, and which was then referred for report to the Committee of papers. The Committee had accepted the obliging offer of one of its Members to examine the work, and procure the opinion of some of the head Moulavees of the Madressa, as to the purity, correctness, elegance, and simplicity of the language employed; and he had now the pleasure to read the following letter from Dr. Mouat, in reference to that offer:—

To JAMES HUME, ESQ., *Hony. Secy. A. and H. Society.*

SIR,—I have the honor to return the translation by Mr. Fenwick, of a work on an improved system of Agriculture, which I have carefully examined, as well as submitted to competent native authority, to ascertain the nature and quality of the Hindustanee. The report of Moulavees Akhbar Shaw and Mahomed Syied, I beg leave to enclose in original, with a translation; and as both those gentlemen are men of acknowledged learning and ability, their opinion can be depended upon by the Society.

As respects the matter itself, it appears to me correct, and to convey European notions upon the subjects discussed in a Vernacular medium, so as to be quite intelligible to any native agriculturist of ordinary information and education. The English expressions are very properly orientalized, and, in some cases, with a creditable degree of elegance and excellence. There are numerous verbal errors, which are, most likely, the fault of the copyist, but which will require to be carefully corrected, if the work should be printed by the Society.

The translation is, certainly, worthy of being patronized by the Society; but whether it be deserving of Mr. Tucker's prize and fulfils his intentions in offering a reward, I do not consider myself competent to decide—my acquaintance with Agriculture and Hindustanee not being sufficiently extended to permit of my doing so conscientiously.

I have, &c.,
(Signed.) F. J. MOUAT, M.D.

Medical College, January 4th, 1845.

It was agreed, with reference to the closing portion of Dr. Mouat's letter, that the manuscript be forwarded to Mr. Tucker, and that he be requested to favor the Society with his opinion thereon, or with the opinion of any other party who may be competent to speak of the usefulness of the work in an Agricultural point of view. Further, that Mr. Fenwick be requested to submit an English version of the work to the Society.

Proceedings of Branch Societies.

Letters were read from the Secretaries of the Branch Societies of Cuttack, Baugelpore, Lucknow, and Simla, reporting the progress of their respective institutions. Captain Dunlop incorporates, in his communication, an account of various cultures in the Cuttack garden, and gives the result of the exhibition of vegetables which took place on the 25th of December last. Major Napleton encloses an account of the show of vegetables, flowers, &c., which was held at Baugelpore on the 16th January, and gives the names of twelve new subscribers, since his last report of the 19th of November. Captain Hollings forwards an account of the meeting, which took place on the 20th December, of the members of the Lucknow Branch Society, and a long and interesting report regarding the state of the garden under his charge; and Dr. Corbyn presents a copy of the proceedings respecting the establishment of a Branch Horticultural Society and Garden at Simla.

The above communications were referred to the Committee of Papers for publication in the journal.

Communications on various subjects.

The following letters and papers were also submitted :—

1. From C. Beadon, Esq., Under Secretary, Government of Bengal, transmitting copy of a report, with enclosures, from the Commissioner of Arracan, regarding certain teak-producing localities in that province.

2. From Dr. A. Campbell, presenting a Gardener's Calendar for Darjeeling.

3. From W. Limond, Esq., Secretary Chamber of Commerce, forwarding, by desire of the Chamber, a communication from Mr. Southey on the subject of improving the breed of sheep in India.

4. From A. Sconce, Esq., presenting a paper on the relative position of landlords, tenants, produce, labour and wages in India and England.

5. From C. B. Taylor, Esq. forwarding a piece of rope made from the fibres of the jeetee (*Asclepias tenacissima*), and giving a few particulars regarding it.

6. From Capt. T. E. Rogers, Master Attendant, enclosing a memorandum descriptive of the result of experiments made with the *jeetee* rope, &c.

7. From Lieutenant W. F. Nuthall presenting a catalogue of the collection of woods indigenous to Arracan, forwarded by him in September last.

8. From Dr. Alexander Grant, presenting a few drawings, with letter press, descriptive of the Chinese method of tile and brick making, of burning shells for lime, and of expressing oils.

9. From Dr. M'Clelland, forwarding analyses by Mr. J. G. Scott, of the soils from the Tenasserim Coast, presented by Mr. O. Riley, and expressing his approval of them.

10. From C. Beadon, Esq., Under Secretary Government of Bengal, forwarding copy of a report on the teak forests on the Thoungyeen River, Tenasserim Province.

All the above communications were referred to the Committee of Papers.

11. From H. Giraud, Esq. Secretary to the Agri-Horticultural Society, Bombay, agreeing to the proposal of publication in this Society's Journal of papers presented to them.

12. From G. G. Mercer, Esq., alluding to the circumstance of grain keeping free from weevil, when preserved in jars, which have been prepared by baking *in the sun.*

13. From Major C. G. Dixon, Superintendent of Ajmere, intimating that the small supply of American maize, transmitted to him last year, has given returns so superior to the indigenous maize of Ajmere and Mhairwarra, that he is desirous of being furnished with a much larger quantity for distribution next season.

The Secretary mentioned, that he had forwarded to Major Dixon several seers of the acclimated American maize, from the Nursery garden.

14. From L. Wray, Esq. offering his services to procure for the Society a few plants and seeds, from the Royal Agricultural Society of Jamaica, of the guynep, star apple, calabash, &c.

Referred to the Garden Committee.

For all the above communications and presentations, the best thanks of the Society were accorded.

A correspondence between Mr. Robison and Dr. Mouat, and a letter from Dr. Mouat to the Secretary, regarding a drawing of the Metcalfe Hall, which has been prepared by Mr. Clarihew, was also submitted. Also a letter dated 18th January 1845 from Mr. Clarihew to Dr. Mouat, furnishing, by desire of Dr. Mouat, copy of his (Dr. M's.) letter to Mr. Clarihew, requesting him (Mr. C.) to make a sketch of the Metcalfe Hall for the purpose of reducing it to form a vignette on the title page of the Society's Journal. After some discussion it was agreed, that Mr. Clarihew's claim of two hundred rupees, as his remuneration for the drawing, be liquidated.

(*Wednesday, the* 12*th of March,* 1845)

The Hon'ble Sir J. P. Grant, President, in the chair.

The proceedings of the February meeting were read and confirmed.

Members Elected.

The gentlemen proposed at the last meeting were duly elected members of the Society; viz:—

Messrs. J. P. Gubbins, W. A. Rolfe, G. L. Young, Brian Hodgson and C. C. Bruce, Baboos Debendernauth Tagore, Nursingchunder Bhose, Nobinchunder Bhose and Hemnaut Roy.

Candidates for Election.

The names of the following gentlemen were submitted as candidates for Election.

H. Atherton, Esq., C. S. Pubna—Proposed by Mr. A. Sconce, seconded by Mr. F. Stainforth.

E. L. Brandreth, Esq., C. S. Ajmere—Proposed by the Secretary, seconded by Mr. M. Wylie.

Lieut. A. L. MacMullin, (23d N. I.)—Proposed by Major T. E. A. Napleton, seconded by the Secretary.

C. Congreve, Esq., Merchant, Calcutta.—Proposed by Mr. E. L. Ryder, seconded by Mr. W. G. Rose.

George May, Esq., (Firm of Saunders, May, Fordyce, and Co.).—Proposed by Dr. Huffnagle, seconded by Mr. L. Balfour.

Presentations to Library.

1. Report of the Bombay Chamber of Commerce, for the first quarter of 1844-45. *Presented by the Chamber.*

2. Journal of the Asiatic Society of Bengal, No. 68. *Presented by the Society.*

3. The India Journal of Medical and Physical Science, Nos. 2 and 3 of vol. 3.—*Presented by Dr. Finch.*

GARDEN AND MUSEUM.

1. A small quantity of the seed and pods of the American Sumach or Dividivi, (Cæsalpinia coriaria) the produce of the Botanic Garden. *Presented by Dr. Wallich.*

The Secretary mentioned that he was about transmitting small supplies of this seed for the gardens of the Branch Societies of Lucknow, Bauglepore, Cuttack, &c., and to a few members in other parts of the country, who had expressed their willingness to give a fair trial to any seeds that might be occasionally furnished to them and to report the result to the Society.

2. Sample of Cotton from the Government cotton farm at Gorruckpore. *Presented by H. C. Tucker, Esq.*

2. Samples of Cotton in pod, in *kuppass*, and in a cleaned state; all the produce of Upland Georgia seed. *Presented by Major T. E. A. Napleton, Secretary Bauglepore Branch Society.*

3. Sample of cotton grown at Bejepore factory, Buxar, from Mexican seed furnished to him by the Society. *Presented by P. P. Carter, Esq.*

The Secretary submitted a report on all the above samples, which had been obligingly drawn up by Mr. James Potter. He mentioned that extracts therefrom had been furnished to the respective donors, and that, with the sanction of the meeting, he would transfer it, and the letters connected therewith, to the Committee of Papers for publication in the Journal. This was agreed to.

4. Two samples of potatoes, the result of an interesting experiment lately made in his garden at Cossipore. *Presented by William Haworth, Esq.*

5. A tree of the *Urhur Dall.* *Forwarded for inspection by Capt. J. A. Currie.*

Capt. Currie states that this tree is the produce of a stray seed which was by mistake included in a packet of flower seeds sent from the Cape. The seed was planted in October 1842, and took between 16 and 17 months in ripening its seed, by which time it had attained the height of 14 feet, and a circumference of 10 inches at the root of the stem, the branches extending about 5 feet on each side. On counting the seed, Capt. Currie found that the tree had given an enormous produce, nearly 11,500 fold, which is about twenty times more than is yielded by the Indian tree; the latter, however, only requiring half the time, of the other (from 8 to 9 months) to ripen its seed. Capt. Currie presents a quantity of the seed, but from the time it has taken to come to perfection, he thinks it is questionable whether the cultivation of the "Cape dall," in India, would be of advantage.

6. A small supply of cauliflower seed, from the garden of the Cuttack Branch Society. *Presented by Capt. W. W. Dunlop.*

Exhibition of Celery.

A list of the prizes which were awarded at the exhibition of celery on the 11th of March, from the amount placed at the disposal of the Society, by Mr. W. P. Grant, was read. In the remarks appended to the list it is mentioned that there were altogether about 25 baskets, but with the exception of 5 or 6, all the samples were inferior, wanting in firmness of stalk and not sufficiently blanched. The sample for which the first prize was given was very superior to all the others, but not sufficiently well cultivated to induce the Committee to award the sum which had been originally fixed, namely, sixty-four rupees. For the same reason the rewards for the second and third best specimens were reduced from 16 and 8, to 10 and 5 rupees. Small prizes of two and one rupees were given, to all the other samples not for their goodness, but with the view of inducing the *malees* to pay greater attention to this vegetable and to exhibit a better result at the next or May show. The Committee, some months ago, circulated a paper in Bengalee, on the mode of cultivating celery by the European process of planting out in trenches, and earthing up as the plant grows, but most of these samples appeared to have been grown after the old native fashion of loose earthern tubes, and as a consequence, the stalks were weak, pipey and wanting in whiteness of colour. The total amount awarded on this occasion was 61 rupees.

Floricultural Exhibition.

A list of prizes amounting to 78 rupees which were awarded at the flower show on the 14th of February last, was next submitted. It is stated that there was altogether a varied display of exotics. The heartsease, passifloras, pentstemon, clarkias, variegated larkspurs, antirhinums, petunias, and euphorbias, afforded perhaps the best specimens. Some tolerably good plants of Astrapœa Wallichii, begonias, and maranda barcleyana were also shewn, as also fair specimens of the poivrea coccinea, coreopsis, pinks, narcissus, German aster, oxalis of three or four kinds, phlox drummondii, &c. &c. There was but a poor show of dahlias, it being almost too late in the season for them; the geraniums also were confined to five kinds; the violets were poor in quantity, and with two or three exceptions, in quality also. Prizes were offered for sweet peas, escholtzias, auriculas and primroses, but there was not a single specimen of any of these varieties. The wall-flowers and lupins were very inferior.

The display of indigenous flowers was not equal to that of exotics. The ixoras, goldfussias, and roses were in larger quantity than other varieties; prizes were given for them, and for best specimens of eranthemums, and of the orchideœ and malvavaceœ.

The Garden Committee also submitted a list of the flowers for which prizes are to be awarded at the next show. The Committee suggest that the show be held on the 15th of April next, at 11 o'clock, and that the judges be requested to meet two hours previously to arrange the prize specimens. The day and hour of meeting was agreed to.

Tribute of Respect to the Memory of the late William Griffith, Esq.

The Secretary having previously drawn the attention of the members to the circumstance of the melancholy intelligence, which had been received since the last meeting, of the demise at Malacc of Mr. William Griffith, late a Vice-President of the Society, begged to submit the following letter, from Mr. McClelland with th memoir therein referred to:—

To JAMES HUME, ESQ., *Hony. Secy, Agri-Horticultural Society.*

MY DEAR SIR,—On receipt of the painful news of the death o Mr. W. Griffith, I wrote to Mr. Ridsdale to discontinue, or at leas suspend the printing of the 21st number of the Journal of Natura History, until I should make up my mind as to whether to continu it under the painful circumstances or not.

I have now resolved to abandon it, particularly as it was chiefl undertaken in the first instance to afford him and his friends channel of publication in their own interest. He leaves so great blank here in the branch of science he represented that it may easily be understood from what was said in the preface of the 20th number of the Journal of Natural History, we could not carry that work on without him.

I should be happy, therefore, to transfer such papers as are on hand (connected with plants) to the Journal of the Agri-Horticultural Society, it being my intention to make a similar offer of papers on other subjects to the Journal of the Asiatic Society.

I should also be happy to offer to the Society, with a view to raise a fund for the publication of Mr. Griffith's extensive MSS. the remaining sets of the Journal of Natural History, probably 50 or 60 which if gradually sold, as they might be in the course of a few years at their published price, would raise a fund of some 3 or 4 thousand rupees. I have no doubt some measures will be taken in England with the view to the publication of his labours. It may be premature to enter upon the question at present, but I should be glad to receive the answer of the Society, as to whether it would be compatible with its object to accept the above offer with such a view.

I take the same opportunity of submitting a sketch of what I know of his services and occupations in India, to lay it before the Society, or to print it in the Journal, or in any shape the Society may wish.

Sincerely yours,

12*th March* 1845. J. McClelland.

At the close of the perusal of the above letter, the following resolution was submitted by the Secretary, seconded by Rajah Radakant Deb Bahadoor, V. P. and unanimously agreed to:—

"That the Society is deeply sensible of the loss it, as well as the science of botany, has sustained in the death of William Griffith Esq., one of the Society's most valuable members. It readily accepts the charge tendered by Mr. McClelland of the surplus numbers of the Journal of Natural History, and offers its best thanks to him for the memoir of his late friend."

Communications on various subjects.

The following letters and papers were also submitted:—

1. From C. Beadon, Esq., Under Secretary Government of Bengal, forwarding copy of a second communication from the Commissioner of Arracan, shewing the existence of teak trees on the borders of the Thaddi stream, near Sandoway.

2. From A. Shakespear, Esq., Assistant Secretary to Government N. W. P., placing at the disposal of the Society by direction of the Hon'ble the Lieutenant Governor, extracts from reports by Mr. Blount, the American planter, regarding the cotton farm at Goruckpore.

3. From Capt. G. E. Hollings, Secretary of the Lucknow Agri-Horticultural Society, enclosing an account of their first Horti-floricultural exhibition, held on the 12th of February.

4. From F. Nicol, Esq. Chandpore factory, Jessore, giving a tabular statement of the produce obtained from certain varieties of sugar cane.

The above letters were referred to the Committee of Papers.

5. From J. G. Bruce, Esq. dated Cawnpore, 31st January, requesting the assistance of the Society in procuring him a large supply (125 maunds), of cotton seed with the view of making an experiment on an extended scale, in the vicinity of Culpee.

Mr. Bruce offers to remit the amount cost of the seed, in the event of the Society being able to procure it for him, to undertake the experiment at his own cost, and to report the result of it to the Society at the end of the season.

The Secretary mentioned that the Society had not at present any cotton seed in store. Dr. Huffnagle, who was present, intimated that he had a large supply of American seed, and if on trial it should prove to be good, he would be happy to place the whole of it at the disposal of the Society. The thanks of the Society were returned to Dr. Huffnagle for his kind offer, and the Secretary was directed to inform Mr. Bruce of the same.

6. From H. Fenwick, Esq. intimating his readiness to meet the Society's request for an English translation of his Hand-book of Agriculture &c. in the event of the latter meeting the approval of Mr. H. C. Tucker, to whose decision the work has been referred by the Society.

Notice of Motion.

At the close of the meeting the Secretary called attention to the circumstance of a member of the Society having declined to pay his subscription for the period of his residence at the Cape. The subscription of members visiting the Cape had hitherto been always continued in virtue of the sixth article of the regulations which provides that "Members whose absence from India *beyond* the Cape is merely temporary, shall continue to be borne on the list of members, but shall be exempt from the payment of subscriptions,

A bill of Messrs. Currie and Co.'s for 641 rupees, the balance of their account for furniture for the Society's apartments at the Metcalfe Hall, was submitted, from the Finance Committee, and passed for payment.

							Temperature.			Wind.		Temperature.			Wind.		Tempera			Win		
Moon's Changes	Barometer.	Of the Mercury.	Of the Air.	Of an Evapg. Surface.	Direction.	Barometer.	Of the Mercury.	Of the Air.	Of an Evapg. Surface.	Direction.	Barometer.	Of the Mercury.	Of the Air.	Of an Evapg. Surface.	Direction.	Barometer.	Of the Mercury.	Of the Air.	Of an Evapg. Surface.		Upper.	Lower.
	Inches	°	°	°		Inches	°	°	°		Inches	°	°	°		Inches	°	°	°		Inche	Inch
☽	,,	,, °	,, °	,, °	,,	,,	,, °	,, °	,, °	,,	,,	,, °	,, °	,, °	,,	,,	,, °	,, °	,, °	,,		
	30,161	65,4	67,0	65,4	N. W.....	30,117	70,0	72,0	69,8	N. W.....	30,035	72,2	82,0	73,8	N. W.....	30,041	72,0	74,5	72,4	Calm,		
	,138	66,5	66,0	64,0	N. W.....	,098	70,3	72,0	69,0	N. W.....	,050	73,0	80,0	73,7	N. W.....	,061	72'8	75,0	72,2	N. W.		
	,170	66,5	66,5	65,0	N. W....	,117	70,0	72,0	69,8	N. W.....	,048	72,7	80,0	73,0	W.	,054	72,0	74,0	72,5	W. ..		
	,133	67,0	68,0	66,5	N.	,089	69,5	72,0	70,0	N. E.	,033	71,0	82,0	75,7	N. E.	,044	71,0	76,0	74,9	Calm,		
	,246	68,0	67,8	77,0	N.	,210	71,0	72,8	71,5	N. W.....	,160	73,5	82,0	76,4	N. W.....	,166	73,0	77,0	76,0	Calm,		
	,310	68,5	69,0	68,2	N.	,269	71,4	74,0	72,4	N. W.....	,229	74,4	85,0	77,0	W.	,225	74,0	76,8	77,0	Calm.		
	,286	70,5	71,0	70,0	N. W.....	,262	73,0	76,0	73,8	N. W.....	,200	76,5	85,0	77,0	S. W.....	,205	76,2	78,0	75,0	Calm,		
	,278	70,9	70,0	68,5	N. E.	,229	73,2	75,8	72,7	W.	,166	75,0	86,0	76,4	N. W.....	,177	74,5	79,0	76,5	Calm.		
	,266	69,0	69,0	67,5	N. E.	,217	72,0	74,5	71,4	N. W.....	,170	75,0	80,4	77,0	W.	,184	75,0	78,0	76,0	Calm,		
	,333	68,5	69,0	67,5	N. E.....	,286	71,9	74,4	71,8	N. W.....	,238	74,5	79,8	77,0	N. E.	,242	74,0	78,0	76,0	W. S.		
	,354	70,2	70,0	69,0	N.	,289	71,0	76,0	72,0	N. E.	,250	74,2	81,0	78,2	N.	,260	74,0	78,0	77,0	N. ..		
	,294	70,5	72,0	70,8	E.	,254	73,8	77,0	74,5	E.	,180	76,5	81,0	77,0	W.	,190	76,0	78,0	76,8	N. W.		
	,226	70,4	71,0	69,7	N. E.	,176	73,5	76,0	74,0	W.	,086	77,0	81,0	75,8	W. S. W.	,,	,,	,,	,,	,,		
☾	,178	70,5	71,5	70,2	W.	,133	74,0	78,4	72,5	W. S. W.	,065	78,0	82,0	73,7	W. S. W.	,082	77,4	77,4	71,5	S. ..		
	,230	69,5	70,0	69,0	W. S. W.	,200	72,0	74,0	71,0	W. S. W.	,117	76,0	81,0	72,0	W.	,130	76,4	76,0	69,0	Calm.		
	,241	68,4	68,0	67,7	N.	,200	73,0	79,0	72,5	S. W.....	,118	76,0	81,4	70,5	W.	,120	75,3	77,4	70,6	Calm.		
	,238	71,0	74,8	70,7	S.	,212	75,5	80,2	72,8	S. W.....	,120	77,4	83,5	72,0	W.	,125	77,5	78,8	71,6	Calm.		
	,217	72,0	74,0	71,0	S. W.	,200	75,0	79,2	73,0	W.	,116	76,5	83,0	71,8	N. W.....	,122	76,8	80,0	71,0	N. ..		
	,205	72,0	76,5	72,5	N. E	,173	75,0	82,7	69,5	W.	,112	78,0	,,	,,	W.	,117	78,5	,,	,,	Calm.		
	,157	71,5	,,	,,	S. W.....	,,	,,	,,	,,	W.	,062	84,0	83,8	,,	S.	,062	80,8	79,7	70,5	S. W.		
	,170	76,2	77,5	75,0	S.	,142	81,5	82,0	69,7	S. W.	,053	84,7	84,0	73,0	S.	,050	80,0	80,0	70,5	S. ..		
⊙	,157	72,0	72,0	68,2	N.	,125	79,5	81,4	68,5	N. E.	,070	84,2	83,5	69,5	W.	,070	80,2	78,5	69,5	Calm.		
	,182	74,8	75,4	69,0	E	,155	80,0	79,6	69,0	N. E.	,080	84,5	83,5	75,4	S.	,077	81,4	79,6	74,4	Calm.		
	,165	73,8	74,5	70,5	S. W.....	,138	80,5	80,5	73,8	S.	,066	84,5	83,9	70,5	S.	,058	81,0	79,2	70,8	Calm.		
	,132	71,0	72,6	67,0	E. (sharp)	,118	80,0	79,8	69,0	S. E.	,059	84,0	82,5	69,8	S. E.	,058	80,5	80,0	69,2	S. W.		
	,129	76,0	76,5	66,5	E.	,113	81,8	81,6	69,0	S. E.	,022	83,0	83,1	70,0	S. W.....	,025	88,0	78,9	72,0	W. ..	0,27	0,34
	,153	70,4	71,5	66,0	E.	,130	76,4	76,0	67,6	N. W.....	,074	81,0	79,9	70,0	N.	,060	78,0	76,3	69,0	Calm.	0,05	0,06
	,214	64,0	64,0	62,5	W.	,099	67,0	68,3	64,7	S. E.	,069	76,8	75,1	67,0	E.	,079	74,4	72,4	67,5	Calm.		
	,120	69,5	71,5	67,8	E.	,098	79,0	78,5	69,7	W. S. W.	29,994	81,4	80,9	72,8	N. W....	29,993	76,8	74,0	69,5	S. ..	0,66	0,
	,090	67,5	68,2	65,7	E.	,078	71,0	71,2	67,4	N. E.	,014	71,0	71,4	66,4	E.	,009	70,5	70,1	67,0			
	30.206	70.1	70.9	68.2		30.170	74.2	76.4	70.8		30.102	77.6	[illegible]	72.6		[illegible]	76.2	[illegible]			[illegible]	

Meteorological Register kept at the Surveyor General's Office Calcutta, for the Month of February,

Days of the Month.	Moon's Changes.	Observed at 9 H. 50 M.					Observations Made at Apparent Noon.					Observed at [illegible] P. M.					Observations Made at set.					El	
			Temperature.			Wind.		Temperature.			Wind.		Temperature.			Wind.		Temperature.				Feet. 56	Feet 4
		Barometer.	Of the Mercury.	Of the Air.	Of an Evapg. Surface.	Direction.	Barometer.	Of the Mercury.	Of the Air.	Of an Evapg. Surface.	Direction.	Barometer.	Of the Mercury.	Of the Air.	Of an Evapg. Surface.	*Direction	Barometer.	Of the Mercury.	Of the Air.	Of an Evapg. Surface.	Direction.	Upper.	Lower.
		Inches	°	°	°		Inches	°	°	°		Inches	°	°	°		Inches	°	°	°			
1		30,011	71,8	73,0	69,4	N. E.	29,974	75,5	76,0	70,5	N	29,887	81,4	80,5	71,5	W.	29,889	77,5	77,0	72,0	N.		
2S.		,028	73,5	74,6	69,5	W. ∞ S...	,996	79,5	79,2	71,0	W ∞ S.	,893	82,0	82,0	72,0	N. ∞ S.	,897	79,5	78,8	71,0	W. ∞ S.		
3		,007	74,9	76,0	71,0	W.	,969	81,2	81,6	71,5	W.	,865	84,0	83,4	70,5	W. ∞ S.	,878	80,0	80,0	77,0	N. ∞ W.		
4		,028	74,9	75,5	70,5	N.	,977	81,0	81,5	73,0	N. ∞ W	,894	84,8	84,2	71,2	N.	,896	81,0	80,0	74,0	N.		
5		,049	76,0	78,0	68,0	N.	30,017	81,0	81,8	66,0	N. ∞ W	,944	85,0	84,2	65,4	N.	,949	80,8	70,2	60,2	N.		
6		,113	74,0	75,8	62,5	N. ∞ W...	,086	79,8	80,0	66,0	N.	995	83,0	82,0	64,5	N.	,996	79,0	76,0	63,0	N.		
7		,117	73,0	74,0	61,5	N.	,093	79,0	79,4	62,0	N. ∞ W	30,010	82,0	81,0	64,0	N. ∞ W.	30,011	78,5	78,0	64,0	N. ∞ W.		
8		,118	71,0	71,8	61,0	N. ∞ W...	,082	77,0	76,7	60,0	N. N. W.	29,990	82,0	81,0	62,5	N.N.W.	29,992	78,0	75,5	60,0	N. ∞ W.		
9S.		,101	73,0	75,0	59,0	N. ∞ W...	,060	79,0	79,0	59,4	N. ∞ W.	30,002	82,3	81,8	62,0	N. ∞ W.	30,016	78,2	76,0	62,0	N. ∞ W.		
10		,150	70,5	72,0	61,0	N. ∞ W...	,100	78,0	77,5	63,0	N. ∞ W.	29,977	81,2	79,8	64,5	N. W...	29,983	77,5	76,0	65,0	N. ∞ W.		
11		,078	72,0	73,4	67,0	N. N. W.	,030	79,0	79,6	68,5	N. N. W	953	84,5	83,0	71,0	N.N.W.	,961	79,5	78,5	70,0	N. N. N.		
12		,133	73,0	73,6	63,0	N.	,096	79,5	79,8	67,0	N. N. W	,986	82,9	82,0	67,0	N. ∞ W.	30,001	79,0	79,2	67,0	N. ∞ W.		
13		,097	74,3	75,7	65,0	N. N. W.	,049	81,0	80,8	64,0	N. ∞ W.	,967	8,40	83,0	66,0	N. ∞ W.	29,974	80,5	79,2	63,0	N. ∞ W.		
14	☾	,101	74,0	75,0	61,5	N. W. ..	,060	81,0	81,0	65,0	N. W. ..	,996	84,5	83,5	63,5	N. ∞ W.	,977	80,0	78,5	64,0	N. ∞ W.		
15		,080	74,0	76,6	65,6	S. ∞ E...	,048	82,8	83,0	71,0	S. ∞ E	,956	87,8	86,0	63,0	S. ∞ E.	,962	82,0	79,0	65,0	S. ∞ E.		
16S.		,063	76,5	78,0	66,5	S. ∞ E...	,028	83,9	83,0	67,4	S. E. ...	,938	89,0	86,0	66,0	S. ∞ E.	,936	84,5	81,0	66,9	S. E. ..	0,33	0,50
17		,021	74,0	73,8	71,4	S. ∞ E ..	,010	79,0	79,5	72,5	N. ∞ E.	,925	80,5	80,0	67,4	N. ∞ E.	,924	77,2	76,3	66,0	N. ∞ E.	0,02	0,0
18		,065	75,0	66,0	64,5	N. ∞ E...	,024	70,0	70,5	67,0	N. ∞ E	,932	78,0	76,5	70,2	N. ∞ E	,932	76,0	75,0	70,2	N.		
19		,046	74,0	74,4	70,5	N ∞ E...	,014	79,0	79,5	73,0	N. ∞ E.	,908	82,5	81,4	71,0	N. E. ..	,910	80,0	79,7	75,5	N. ∞ E.		
20		,042	74,0	75,2	67,0	N. ∞ E...	,007	80,0	80,0	67,5	N.	,896	84,0	83,5	68,8	N.	,899	80,2	80,0	66,0	N.		
21		,040	73,0	73,8	68,0	N. ∞ W.	,014	74,0	74,8	68,0	N. ∞ W.	,941	76,2	76,8	66,4	N. ∞ W.	,952	75,2	74,8	67,0	N. ∞ W.		
22	○	,062	72,5	74,5	66,0	N.	,025	80,5	81,0	68,0	N. ∞ E	,911	86,0	65,0	67,0	N. ∞ E.	,912	82,5	81,4	68,0	N. ∞ E.		
23S.		,037	73,4	74,2	67,5	N. ∞ E...	,014	80,5	82,0	70,0	N. ∞ E.	,932	79,5	80,4	68,0	N. ∞ E.	,924	78,0	77,0	67,5	N. ∞ W.		
24		,050	74,2	75,0	65,0	E.	,016	81,6	81,8	67,8	E.	,926	86,5	76,0	70,0	N. ∞ E.	,926	82,5	81,8	70,0	N. ∞ E.		
25		,073	71,5	73,0	65,0	N. ∞ W.	,036	78,0	78,5	66,0	N. ∞ E	,917	84,0	83,5	67,5	N ∞ E	,941	79,0	77,0	68,0	N. ∞ W.		

						Temperature.			Wind.		Temperature.			Wind.		Temperature.			Wind.		
Barometer.	Of the Mercury.	Of the Air.	Of an Evapg. Surface.	Direction.	Barometer.	Of the Mercury.	Of the Air.	Of an Evapg. Surface.	Direction.	Barometer.	Of the Mercury.	Of the Air.	Of an Evapg. Surface.	Direction.	Barometer.	Of the Mercury.	Of the Air.	Of an Evapg. Surface.	Direction.	Upper.	Lower.
Inches	°	°	°		Inches	°	°	°		Inches		°	°		Inches	°	°	°		Inch	Inches
29,962	77,8	77,8	71,5	N.	29,928	84,5	85,0	72,0	N. b W.	29,836	86,8	88,2	73,0	N. b W.	29,836	84,0	83,0	74,0	N. b W.		
30,001	76,0	77,0	62,0	N.	,950	81,2	82,5	65,2	N. b E...	,851	88,0	86,5	69,0	N. b E...	,854	83,0	82,5	68,0	N. ..		
29,960	78,5	80,0	60,5	N. b E.	,922	84,8	84,8	64,0	N. b E...	,813	88,5	87,5	65,5	N. b E ..	,816	84,0	82,0	71,0	N. b E.		
,920	79,1	80,9	63,0	N.	,890	85,0	85,5	65,5	N. b E...	,812	89,0	89,0	65,8	N. b W.	,820	84,5	82,3	68,2	N. b W.		
30,027	78,0	79,2	62,5	N.	,989	84,0	84,0	62,0	N. b W.	,910	88,5	87,4	65,8	N. b W.	,912	83,8	81,2	68,0	N. b W.		
,042	80,5	81,9	65,0	N.	30,003	86,3	86,0	64,0	S. b W...	,911	89,5	89,0	66,0	N. b W.	,907	84,2	82,6	68,0	N. b E.		
,028	81,0	83,0	70,5	S. b W.	29,985	88,0	88,4	72,0	S. b W...	,875	92,0	91,0	67,0	S. b W...	,876	87,0	83,6	69,0	S. b W.		
29,992	81,8	83,0	76,0	S. b W.	,953	89,0	89,8	73,5	W.	,845	93,0	93,0	74,0	W.	,852	87,5	88,0	72,0	S. b W.		
,990	82,0	83,0	77,5	S. b W.	,958	88,0	89,0	76,5	S. b W...	,869	93,2	93,0	74,6	W.	,860	90,2	89,8	75,8	W. ..		
30,090	74,0	74,8	70,9	W.	30,069	82,0	83,8	72,6	S. b W...	,982	89,0	89,0	70,0	N. b W.	,973	84,8	83,0	71,0	W. ..		
,089	82,0	83,9	73,4	N. b W.	,060	88,5	89,0	72,0	N	,949	92,5	92,0	77,0	N. b W.	,946	88,0	87,0	76,2	N. ..		
,098	85,0	86,5	74,0	N. b W.	,068	90,0	90,5	71,0	N. b W...	,975	93,4	92,8	76,0	S. b W...	,978	88,0	87,0	74,2	S. b W.		
,091	85,0	86,0	72,5	W.	,048	91,0	92,0	78,0	W.	,956	94,8	94,0	70,0	S. b W...	,965	89,2	88,0	74,0	S. b W.		
,086	84,8	86,2	71,2	W.	,053	92,2	93,0	72,2	N. W.....	,954	95,0	95,0	71,6	N. W.....	,962	90,2	88,0	75,2	N. W.		
,044	87,0	88,4	74,0	W N. W.	29,995	91,8	92,8	73,5	W. N. W.	,931	94,2	94,0	72,6	N. W. ..	,940	89,8	89,0	77,0	N. W.		
,046	82,4	83,0	71,0	N.	30,021	86,2	87,2	75,0	N. N W.	,943	89,0	89,0	71,2	N.	,949	86,0	85,3	70,0	N. ..		
,047	82,8	82,8	70,8	N. b W.	29,995	89,0	89,6	72,6	N. N. E.	,934	86,9	82,3	70,8	N. W... .	,932	83,2	83,0	71,0	N.N.W.		
,071	86,2	86,2	73,0	N. b W.	30,026	90,5	91,5	73,4	N.	,929	90,5	90,0	73,0	N. N. W.	,937	87,0	86,2	72,0	N.N.W.		
,074	87,9	88,2	71,5	N. W...	,043	93,0	93,3	72,3	E. N. E...	,931	95,6	94,8	71,3	W.	,937	89,8	89,2	70,2	W. ..		
,047	86,4	87,2	75,0	N. W...	,002	94,0	94,8	70,0	W.	,901	95,0	94,8	67,9	W.	,900	89,5	87,8	71,8	W. ..		
29,979	87,0	88,5	68,5	W.	29,935	92,0	93,2	69,5	N. N. W.	,828	95,5	94,5	68,4	W. N. W.	,829	89,2	87,8	71,0	W. ..		
,861	87,0	88,5	67,5	W N. W.	,820	92,5	93,0	68,0	W.	,701	93,5	94,8	67,0	W. N. W	,691	90,3	89,0	70,2	W N.W.		
,742	87,0	88,8	73,0	S. S. W.	,699	94,5	95,5	69,2	W.	,589	99,0	98,5	69,5	W. N. W.	,588	91,0	90,5	67,0	W S.W.		
,715	88,0	89,8	78,5	S. S. W.	,686	97,0	98,0	74,5	S.........	,588	101,0	100,0	72,5	W. W. S.	,587	95,0	94,0	72,0	W S.W.		
,751	87,5	88,5	80,5	S. S. W.	,732	95,5	96,2	78,5	S.........	,630	101,5	101,4	73,5	S. W.....	,638	91,8	90,2	80,6	S.S.E		
,779	89,0	90,0	80,4	S.	,752	94,0	95,0	76,8	S. S. W.	,646	98,0	97,5	75,5	W. W. S	,652	91,0	90,5	80,0	S.S.E.		
,813	90,5	92,0	74,0	S. E. ..	,787	96,2	97,8	74,0	N.	,697	100,0	99,0	71,4	S. E.	,697	94,0	93,0	72,0	S. E. .		
,850	90,0	91,4	79,5	S. E. ..	,828	96,0	97,0	75,5	S. S. E. ..	,722	100,0	99,5	73,0	S.	,725	95,0	95,0	73,0	S.S.E.		
863	89,5	89,5	81,0	W. W. S.	,839	95,2	96,0	79,5	E.	,742	100,0	99,0	71,5	N. N. W	,763	93,0	92,5	80,5	S. ...		
885	89,0	90,0	78,5	S. S. E.	,839	83,0	93,5	79,0	S.........	,733	92,0	93,0	[illegible]	W. W. S	,749	89,0	89,0	80,0	S. S.E	0,1	0.17
877	80,0	80,2	77,5	N. N. E.	,829	89,0	89,8	79,0	S. S. E ..	,717	95,1	[illegible]	[illegible]	[illegible]	,737	85,5	84,8	75,0	S. E...		
92	83,0	85,0	72,4		29,926	90,1	90,9	72,3		[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]			

The Observations during the present Month, have been made for the most part with a Supply of new

received into the Observatory, by orders of the Bengal Government, a brief description of the

instrument by Newman, diameter of the tube 0,504

Monthly Proceedings of the Society.

(*Wednesday, the 9th of April* 1845.)

The Hon'ble Sir J. P. Grant, President, in the Chair.

The proceedings of the last general meeting were read and confirmed.

Members Elected.

The gentlemen proposed at the last meeting were duly elected members of the Society, viz :

Messrs. H. Atherton, E. L. Brandreth, C. Congreve, George May, and Lieutenant A. L. MacMullen.

Candidates for Election.

The names of the following gentlemen were submitted as candidates for election :—

Captain S. R. Tickell, Asst. Commr. of Chota Nagpore—proposed by Lieut.-Col. J. R. Ouseley, seconded by the Secretary.

W. H. Bradley, Esq., Medical Service, Ellichpore—proposed by the Secretary, seconded by Dr. Huffnagle.

T. F. Henley, Esq., Merchant, Calcutta—proposed by the Secretary, seconded by Dr. Huffnagle.

Presentations to the Library.

1—Nos. 12 and 13, and part 1 of No. 15 of the Journal of the Royal Asiatic Society of Great Britain and Ireland. *Presented by the Society.*

2—The first half-yearly volume of the Transactions of the Royal Agricultural Society of Jamaica, and a copy of eight practical treatises on the cultivation of the sugar-cane, written to compete for the prize of £100 offered by the Governor of Jamaica. *Presented by the Society.*

3—The India Journal of Medical and Physical Science, No. 4. of vol. 3. *Presented by Dr. Finch.*

Garden and Museum.

1—Samples of gum from the Acacia catechu ; of frankincense from the Boswellia thurifera ; and of the concentrated juice of the *Peasal,* (Pterocarpus marsupium?) all the produce of the Palamow jungles. *Presented by C. B. Taylor, Esq.*

2—A beautiful piece of goat-skin, tanned solely with pods of the American Sumach (Cæsalpinia coriaria,) the produce of the H. C. Botanic Garden. *Presented by Dr. Wallich.*

(Further particulars regarding this experiment will be found in the body of the proceedings.)

3—A quantity of the roots of the *Kapooree* or *Parhee*, (Cissampelos convolvulacea of Wight and Arnott.) *Presented by Col. H. C. M. Cox.*

Col. Cox brings this root to the notice of the Society, in consequence of his having been informed, on very excellent authority,—proved by repeated trials—that it is a complete specific for the bites of the most venomous snakes. Col. Cox states, that "A small piece of the root, about an inch long, is bruised down, with about 20 black pepper corns, and given with a little water to the patient; it causes profuse foaming at the mouth, and the dose is to be repeated at short intervals, two or three times; the patient is also to be kept in active bodily motion, till all symptoms of lethargy are removed."

In reference to the above, the Secretary submitted a suggestion from Dr. Mouat, to the effect, that a portion of this root be sent to Mr. Robertson, the Society's chemical analyser, and the remainder forwarded through the Medical Board to the Surgeons of the three principal hospitals (General, Native, and Medical College,) with the view of obtaining a decided report on the virtues which it is stated to possess. This suggestion was agreed to.

4—An assortment of cypress, pine, cedar, and other hill seeds, from the Saharunpore Botanic Garden. *Forwarded by Dr. Jameson.*

5—Specimens of vegetables, the produce of the Baugulpore Branch Society's Garden, consisting of potatoes, grown from Darjeeling seed; carrots; French white runner and Windsor beans; artichokes and mangul wurzul. *Forwarded by Major T. E. A. Napleton.*

The Secretary mentioned that the above reached, unfortunately, just two days after the last meeting, and could not be preserved for the present meeting. The potatoes and artichokes were excellent specimens, superior perhaps to any exhibited at the Society's exhibition, while the carrots and Windsor beans were fully equal to Calcutta produce. The French and white runner beans were also very fair samples, and the mangul wurzel roots of a fine size.

Exemption to Members from subscription while resident at the Cape.

The motion of which notice was given by the Secretary at the last meeting, to the effect that the words "beyond the Cape," be in future omitted from article 6 of the Regulations of the Society, was brought forward, seconded by Dr. Huffnagle, and unanimously agreed to.

The Sugar Planters' Companion.

The minutes of the Members of the Sugar Committee and Committee of Papers, to whom was referred, conjointly, the subject of a motion given by Mr. W. Storm, at the January meeting, respecting the treatise entitled the "Sugar Planters' Companion," which has been published in the Society's Journal,—were next read. Whereupon it was moved by Mr. Staunton, seconded by Dr. Huffnagle, and resolved, "That on the Report of the Committee, to whom the subject was referred, Mr. Wray be presented with the sum of three hundred rupees, in acknowledgment of his labour in the production of the work in question."

Horticultural Exhibition.

A report from the Fruit and Kitchen Garden Committee, regarding the next show of vegetables and fruits, was submitted. The committee propose, that the show be held on Tuesday, the 13th of May, at 7 A. M. and give a schedule of prizes, amounting to 147 rupees and two silver medals, to be awarded on that occasion. The committee also offer a few other suggestions in regard to the arrangement, &c., of specimens which, together with the day proposed for meeting, were agreed to. The committee were requested to officiate as judges on the occasion. It was at the same time agreed, that the following gentlemen, viz., Messrs. C. K. Robison, R. Dodd, G. T. F. Speede, and W. G. Rose, should be requested to act as judges at the flower show, which is to be held on Tuesday the 15th instant.

Nerbudda Wheats and White Linseed.

The Secretary mentioned, that he had received from various quarters favorable accounts respecting the Nerbudda wheats and white linseed, of which so splendid a supply was furnished to the Society last year by Lieut.-Col Ouseley. Major Napleton, Secretary of the Bauglepore Branch Society, writes as follows regarding them :—" In reply to the 2nd para. of your communication, I am delighted to tell you the crop of white linseed now growing so luxuriantly in the public garden, will be the means of furnishing many of the large farmers in the adjacent districts with seed for next season, and the Nerbudda wheat (which has also attracted an immense deal of attention far and near) is growing to the extent of three-quarters of a beegah in my garden most luxuriantly, and the produce will be most gratefully reserved for next season's sowings by the rich as well as the poor agriculturists."

Mr. Peter Palmer, writing from Monghyr, observes—"The wheats are progressing capitally, and the small fields are a luxury to look at. You shall have a paper on the subject as soon as I have harvested;" and Captain Hollings, Secy. of the Lucknow Society, in a letter, dated 12th January, states—"The wheat from the Nerbudda, given to the Society by Colonel Ouseley, is thriving admirably, and promises to yield an abundant crop."

Experiment with Sumach, the produce of the Botanic Garden.

A communication from Dr. Wallich, forwarding extracts of letters to his address from Mr. Teil, with the specimen of leather referred to among the presentations, were next submited. Dr. Wallich mentions, that these reports are based on experiments made by Mr. Teil on a quantity of Sumach, the produce of the *Cæsalpinia coriaria*, grown in the Botanic Garden.

In one of his communications Dr. Wallich recommends an extensive cultivation of the tree in this country. He says—" It seems to thrive remarkably well, requiring very little, if any care, except in its youngest state, and a proportionally small expenditure of money. The tree seems to be contented with a very ordinary sort of soil; and in all probability, when once reared from seeds ripened in the country, it will be as productive as in its own native climate—at least sufficiently productive to make the cultivation of the tree an object of importance:" and he adds, " Again I recommend this Sumach to be widely cultivated in this part of the world. I have sent seeds to Madras, Ceylon, and Bombay, and to many places in Hindostan."

The Secretary mentioned that, in addition to the supply of seed which was placed on the table at the last meeting, Dr. Wallich had, at his request, obligingly furnished him with a further quantity, which had enabled him to distribute it not only to the Branch Societies, but to many of the members in various parts of the country, and there was still a small surplus available to any parties disposed to give it a trial.

The thanks of the Society were directed to be given to Dr. Wallich for his interesting communication and extracts, which were referred to the Committee of Papers.

Communications on various subjects.

The following letters and papers were also submitted :—

1—From Cecil Beadon, Esq., Under-Secretary Government of Bengal, forwarding two communications from the Sudder Board of Revenue, regarding the cultivation of cotton, and various other staples in the district of Rungpore.

2—From H. C. Tucker, Esq., transmitting some correspondence connected with the cultivation of cotton at the Government Farm at Goruckpore.

3—From A. Sconce, Esq., enclosing a memorandum regarding cotton cultivation in the district of Chittagong.

4—From Dr. J. V. Thompson, at Sydney, dated 18th January 1845, furnishing a few further remarks respecting the Mauritius and other varieties of Sugar-cane.

(The above communications were referred to the Committee of Papers.)

5—From Dr. Wallich, Superintendent H. C. Botanic Garden, enclosing copy of his correspondence with Government, regarding the Society's application for the extension of ground for its Nursery, situated in the Botanic Garden ; from which the Society are informed, that the Governor of Bengal has no objection to the grant of the additional piece of ground required by them for extending their nursery, provided they agree to certain conditions recommended to Government by the Superintendent of the Botanic Garden.

6—From R. S. Clarke, Esq., Honorary Secretary Royal Asiatic Society, forwarding the copies of the Journal of the R. A. Society, alluded to in the former part of the Proceedings.

6—From T. Bland, Esq., Secretary of the Royal Agricultural Society of Jamaica, transmitting the books noted under the head of presentations to the Library. It was directed, that the Journal of the Society be sent in return.

8—From Edward O'Riley, Esq., dated Amherst, Feb. 25th, animadverting on the regulation of Govt. of the 28th of December 1844, regarding the admission of Foreign Sugars into the Tenasserim Provinces, on the grounds, stated by him to be incorrect, of the local manufacture not being sufficient to meet the local demand. Mr. O'Riley observes, that from the very lowest average of statements now in his possession, he can prove that the cultivation of Sugar-cane has progressed, during the last seven years, from a few thousand plants to 25 millions of canes.

Letters were also read from Major T. E. A. Napleton, at Bauglepore; Mr. P. Palmer, at Monghyr; and Capt. G. E. Hollings, at Lucknow, expressive of their readiness to meet the wishes of the Society for grafts of superior varieties of fruit trees, with which to form a nucleus for the proposed orchard in the Society's Nursery Garden.

For all the above communications and presents, the best thanks of the Society were accorded.

(Wednesday, the 14th of May 1845.)

The Hon'ble Sir J. P. Grant, President, in the chair.

Members Elected.

The gentlemen proposed at the last meeting were duly elected members of the Society, viz.

Capt. S. R. Tickell, Dr. W. H. Bradley, and T. F. Henley, Esq.

Candidates for Election.

The following gentlemen were proposed as candidates for election :—

Lieutenant C. S. Reynolds (49th N. I.) Jun. Assistant Commissioner of Assam; proposed by Lieut. R. Campbell, seconded by the Secretary.

J. H. W. Cox, Esq., Nundungachee factory, Rajshaye, proposed by Mr. H. G. French, seconded by Mr. C. R. Jennings.

The Rev. Dr. Alex. Duff (Missionary Free Church of Scotland), proposed by Mr. M. Wylie, seconded by Mr. J. W. Laidlay.

The Hon'ble Mr. Justice Carr, Colombo, proposed by Sir Lawrence Peel, seconded by Sir J. P. Grant.

Presentations to the Library.

1. Second half-yearly volume of the Transactions of the Royal Agricultural Society of Jamaica. *Presented by the Society.*

2. Journal of the Royal Asiatic Society of Great Britain and Ireland. Part II. No. 15. *Presented by the Society.*

3. Journal of the Asiatic Society of Bengal. Nos. 69, 70 and 71. *Presented by the Society.*

4. The India Journal of Medical and Physical Science, No. 5, of vol. 3. *Presented by Dr. Finch.*

5. Le Bon Jardinier for 1845. *Presented by Messrs. Vilmorin and Co. of Paris.*

Garden and Museum.

1. Twelve Mango grafts from Bombay. *Presented by the Agri-Horticultural Society of Bombay.*

2. A small collection of grape vines, figs, and soursops. *Presented by the Agri-Horticultural Society of Madras.*

3. A plant of the Black stemless Date, from Surgooja. *Presented by Col. J. R. Ouseley.*

Col. Ouseley mentions, that he formerly sent some plants of this previously unknown species of Date to Dr. Wallich and the late Mr. Griffith. The one now presented to the Society, Col. Ouseley states, has fruited in his garden, and he adds, " It grows wild on the table-land of Surgooja, but is not found in Chota Nagpore. The Dates are eaten, and are very agreeable to the taste. The common *Phœnix acaulis* has yellow fruit, not eatable, on every stem *above* the plant, (i. e. the leaves.) The fruit of this is black, and clusters *close on the ground below* the leaves, around the plant, a fact in the history of the Date hitherto not obtained."

(Further particulars about the above trees will be found in the Garden Committee's report.)

4. A supply (about 50 seers) of Upland Paddy from Jushpore, a pergunah of Surgooja. *Presented by Col. Ouseley.*

Col. Ouseley describes this as a superior kind of rice, which, when boiled, becomes very long, and possesses a remarkably fine fragrant, almost aromatic scent. Mr. Haworth reports on this paddy as being a good grain, well grown, and in every respect a desirable quality, but there is nothing," he adds, " in its appearance, to make it more valuable than similar paddy grown in the neighbourhood of Calcutta."

5. A small supply of acclimated Mexican cotton seed from his experimental plantation at Bojepore, near Buxar. *Presented by P. P. Carter, Esq.*

6. A quantity of seed of the Nerium (Wrightea) tinctorium. *Presented by Dr. Robt. Wight.*

7. Two maunds of Madder seed from the south of France. *Forwarded by Messrs. Salavy and Co. of Marseilles.*

(For further particulars regarding this Mexican cotton, nerium and madder seed, see body of the Proceedings.)

8. A sample of Pouchong Tea, manufactured in 1844, at the Government factory, Hawaulbaugh, Kemaon. *Presented by Dr. Jameson.*

It was agreed to transfer a portion of this tea to the Assam Tea Company, and to request the favor of a comparative report thereon, with similar description of tea, the produce of Assam.

9. A quantity of Dahlia seed from the Deyrah Dhoon. *Presented by Capt. Kirke.*

10. A small box of tuberous roots from Lucknow. *Forwarded by Capt. Hollings.*

Capt. Hollings observes, that these roots are said to be those of the Salep Misree (Orchis mascula), and he sends them with the view of ascertaining the correctness of this supposition.

The Secretary mentioned, that he had sent these tubers to Dr. Wallich, who had recognised them as "a species of *terrestrial orchidea,* but states that they certainly are not the orchis root, or salep misree plant."

Nursery Garden : Cane plantation : experiments with Manures : Flower and Fruit tree Nurseries, &c.

The report first submitted was that from the Garden Committee. The committee state, that the late heavy falls of rain have considerably benefitted the cane plantation, and that all the plants, both on the new and old plots, are thriving vigorously, and give promise of an abundant crop this season: the total extent of cultivation is twelve beegahs, which it is anticipated will afford fifty thousand canes during the cutting season of 1845-46. The committee annex a statement regarding an experiment on cane with certain descriptions of manures, from which it appears that the plot applied with oil cake has given the largest produce; cow-dung comes second on the list; Penang and Peruvian guano the third and fourth, and tank earth the last. In regard to the guano, however, the committee express their conviction that, as in the case of previous experiments with American Maize, a sufficient quantity has not been given, and intimate that another experiment with double the quantity (16 lbs. to 2½ cottahs of ground) is now in progress, the result of which will be communicated in due course. The committee next mention, that two additional beegahs of ground have been added to the Flower garden, with the view of more fully meeting applications from members for plants and shrubs of rarer varieties; and suggest that a small sum be allowed to meet the cost of bell glasses, &c. They state, that six of the twelve mango grafts received from Bombay are in good condition, and have been planted out in the fruit tree nursery, and that directions have been given to plant out in the same spot, at the commencement of the rains, the supply from

Madras, which has all arrived in good order. The black stemless date, presented by Col. Ouseley, has recovered the effects of the journey from Chota Nagpore, and will also be shortly placed with the other fruit trees. The Committee lastly allude to the American maize and cotton plots, and to the various other cultures in the nursery, among them the Sumach plants raised from seed presented by Dr. Wallich, which are now ready for distribution ; dahlia plants from Deyrah seed, which will be available next month ; and to madder seedlings from the supply lately received from the South of France.

The report of the Committee was confirmed.

Exhibition of Flowers.

A list of prizes, amounting to 138 Rs., which were awarded at the floricultural exhibition on the 15th of April, was next submitted. In the remarks appended to this list, it is mentioned that the collection of flowers, indigenous and exotic, brought forward at this second quarterly show, was very good ; much better than was generally anticipated, considering the unusually hot weather experienced at the close of March, and the heavy falls of rain in the early part of April. In the list of exotics, the geraniums, of which there were about nine or ten varieties, though two or three kinds only were in flower, the antirrhinums, consisting of five or six sorts, the petunias, pinks of ten kinds, saponarias, sweet Williams, centaureas, and heart's-ease, afforded the best specimens. There were also some good-looking plants of the olea fragrans, lavender, maurandyas, verbenas and mesembryanthemum (ice plant ;) and good cut specimens of variegated larkspur, passifloras of six or seven varieties, and roses, especially two kinds, the canina and carolina, which appear to have been only lately introduced here. There was a very indifferent show of thunbergias, hollyhocks, wall-flowers, coreopsis and gillias. Sweet peas, carnations, iris of sorts, and magnolias were mentioned in the list, but not a single specimen of any of them was brought forward : a portion of the prizes was therefore transferred to a very pretty plant of the oxallis deppei, and to cut specimens of the jatropha pandurafolia, orthostemma roseum, justicia coccinea, and a few others, as enumerated in the list. A prize was given to the mallee of Mr. C. McLeod, for two fine plants of the sprekelia formossissima, or Jacobæan lily, and two more prizes for the second and third best specimens of amaryllis. Among the indigenous flowers nearly all were cut specimens. Of ixoras, there were six or seven kinds, ten varieties of hibiscus, besides roses, lantanas, cassias, gardenias, clerodendron, bauhinias, &c. &c. The bignonia æquinoctialis, of W. I. origin, was the only specimen of that family exhibited. There was also only one cut specimen of the lagerstræmiæ, the L. regina; but as before remarked, neither in quantity nor variety did the indigenous assortment equal the foreign. Nevertheless the show was altogether an encouraging one, particularly in the large proportion of plants that were shown in pots to cut specimens.

Horticultural Exhibition.

A list of the prizes, amounting to 98 Rs. and a silver medal, which were distributed at the show of vegetables and fruits held on the 13th instant, was also brought to notice. Rather more than 200 mallees are stated to have been in attendance on the occasion. Among the European vegetables, the asparagus, onions, kale and parsnips, afforded perhaps the best specimens. The latter in particular were well deserving of the prizes which were given to the owners of them, it being a vegetable seldom if ever seen previously at the exhibitions, and is very seldom cultivated in Calcutta or its vicinity. There were several baskets of cabbages (sugar loaf and red varieties) of turnips, carrots, endive, and beet; some of them containing very fair specimens; a proof that these quarterly shows are likely to effect the object contemplated by the Society, namely, the bringing of our vegetables and fruits earlier into the market, and retaining them longer in season. Prizes were held out for squash, beans of sorts, and Brussels sprouts, but there was not a single specimen of any of these vegetables, and the amount was accordingly transferred to some good samples of horse-radish, mint, spinach, and a few other sorts. The specimens of artichoke and potatoes were too inferior to merit a reward. The celery also was very indifferent, notwithstanding the long notice that had been given of the handsome prizes available to producers of really good specimens. A trifle was awarded for this vegetable, merely with the view of inducing the cultivators to pay greater attention to it. Some excellent samples of maize, grown from American seed received from the Society, were exhibited. As regards the length of ear, number, size and regularity of grain, these were by no means inferior to the original stock, although grown out of season.

In the department of fruits, a silver medal was awarded for grapes, and a prize of 3 Rs. for a basket containing mangosteens and oranges grown at Allipore. There were several tolerable good specimens of peaches, pomegranates, litchees, sapotas, plantains and mangoes, the latter principally from Bombay stock. Among those out of season may be reckoned the pine-apple and pumplenoses; of the former, there were several baskets. Figs, strawberries, apples and apricots were not forthcoming; neither were there, as on the last May show, any melons from Caubool stock.

Society's Petition on the subject of the Sugar Duties.

The Secretary mentioned, that the last mail had brought the following reply from the E. I. and China Association to the letter addressed them in January last, accompanying copies of the Society's Petition on the Sugar duty question :—

To JAMES HUME, ESQ., *Secy. Agri-Horticultural Society of India.*

SIR,—I have to acknowledge the receipt of your letter of the 22nd January, accompanied by two copies of a Petition to Parliament (Lords and Commons) on the subject of the Sugar Duties, requesting this Committee to entrust them to such parties as they consider to take the greatest interest in the matter; I have in consequence to acquaint you, that the one to the Commons was consigned to the care of Mr. J. W. Hogg, who presented it on the evening of the 17th, and that to the Lords has been forwarded to Lord Monteagle. With reference to the difference of opinion among the members of your Society, it would have been satisfactory to this Committee to have been informed of the reasons for their dissent to the Petition*.

I enclose you printed copy of the Sugar Bill, which was read a third time in the House of Commons, and passed on the 18th, with the exception of the 13th clause, which was withdrawn.

I am glad your Petitions arrived so opportunely, and am,

Sir, your obedient servant,

JOHN STIKEMAN.

London: *E. I. and China*
Association, 19*th March*, 1845.

Vernacular Hand-book of Agriculture, Horticulture, and Farming.

A communication from Mr. H. C. Tucker, to whom, as the offerer of a prize for the best Vernacular hand-book of Agriculture and Horticulture, was referred the *M. S.* on that subject, presented to the Society by Mr. Fenwick—was next read. Mr. Tucker observes, that he has submitted the work for the opinions of good scholars, and gives the result of their's and his own ideas regarding it. He is of opinion that it does Mr. Fenwick great credit, but thinks it would be calculated to be much more useful, were certain alterations and additions which he details, made to it, and a general revision of the work undertaken. To effect the latter object, Mr. Tucker suggests, that one-third of the amount of the prize be placed, in anticipation, at the author's disposal, with the view of his procuring the services of a good moonshee. In the event of the author agreeing to this suggested revisal and improvement of his work, Mr. Tucker offers to purchase 200 copies for distribution in his own district, as well as for the use of the Christian school.

---

* The printed copy of the Proceedings of the Special Meeting of the Society will have afforded the required information.

It was agreed, that a copy of this communication be sent to Mr. Fenwick; and, on his agreeing to carry out the suggestions contained therein, a moiety of the sum proposed be immediately placed at his disposal, and the remainder on report of progress being communicated to the Society.

Receipt of a supply of Madder Seed from Europe.

The Secretary drew the attention of members to the resolution passed at the General Meeting in October last, for the obtaining of a supply of Madder Seed from Belgium or France, with the view of giving this useful plant a fair trial in India. The gentleman with whom this recommendation originated had, on that occasion, offered his friendly agency, and he had now the pleasure to submit a late correspondence with Mr. Cowell on the subject, and to intimate the receipt from him, since the last meeting, of a goodly supply of seed, which had been forwarded by the last trip of the *Precursor* steamer. Mr. Cowell observes, that this seed has been procured with great difficulty,—and hence the delay,—from Avignon, through the great kindness of Messrs. Salavy and Co., Bankers of Marseilles, he hopes it will be distributed in the right quarter, as he feels assured that it may be made to form with attention an important article of our exports.

The Secretary submitted a list of members resident at Mussooree, Darjeeling, Nepaul, Tirhoot, Purneah, and various other parts of India, to whom supplies of the seed might be sent with the certainty of knowing that every attention would be paid to the culture of the plant, and the result duly communicated. This list was adopted, and it was agreed, in reference to that portion of the letter from the Secretary to the Government of India to the Society of the 16th Nov. 1842, in which it is stated "that the public frank for the use of any Society shall be confined to special cases in which the Secretary may deem the indulgence to be fairly claimable on public grounds"—that the Secretary of the Society do address the Secretary to Government, soliciting a free transit for this seed to the parties named in the list (with the exception of those to whom supplies can be sent by the Steamer) the sole object of the Society being to endeavour to introduce into the country a plant which, if successfully cultivated, may be the means of adding another useful article to the list of our commercial products.

It was further proposed by the President, and resolved, that the acknowledgments of the Society be given to Mr. Cowell for the trouble he has taken in procuring this supply of seed, and that he be solicited to tender the best thanks of the Society to Messrs. Salavy and Co., for their disinterested kindness on the occasion.

Mode of cultivating Strawberries and Celery at the Garden of the Lucknow Branch Society.

A long and interesting communication from Capt. G. E. Hollings, Secy. of the Lucknow Branch Society, was next read. After alluding to his success in raising cucumbers from English seed by forcing the seeds in a hot bed, and afterwards planting them out, and intimating his intention of shortly sending to the Society seeds of all kinds of flowers produced in the public garden for distribution to members, Capt. Hollings alludes to the culture of strawberries and celery, and gives an account of the mode adopted in raising them.

Capt. Hollings adds, "I am indebted for these two receipts to Nund Loll Misr, an inhabitant of Mynporee, who is the darogah of our garden, and to whom is to be attributed all the success that has attended the experiments that have been made under my auspices, and if they are considered of any value, it would be gratifying to me to be the medium of communicating to him the expression of the sentiments of the Agri-Horticultural Society regarding them ; and although I have done all in my power, by an increase of salary, to show the opinion I entertain of his skill, industry and honesty, I am fully convinced that nothing could tend more to gratify his honorable pride, or stimulate him to future exertions in the good cause of Agri-Horticulture, than the knowledge that his exertions were appreciated by the Parent Society."

At the close of the perusal of the above letter it was resolved, that the thanks of the Society be given to Capt. Hollings for it, and that he be requested to communicate to Nund Loll Misr their sense of his exertions in the cause which the Society is endeavouring to promote.

Cultivation of the Coffee Plant, and introduction of the Walnut-tree and other Cultures in Chota Nagpore.

In the communication forwarding the upland paddy and black stemless date, referred to among the presentations, Col. Ouseley alludes to the attempts he has been making for introducing the walnut-tree into Chota Nagpore, and the success which has attended his experiments in preserving the sweet-brier and other plants from the attacks of the white ants in the following words:—

"In March 1841, I got 200 English walnuts and sowed them; of these, two grew: one, the white ants destroyed, and the other is a tree seven or eight feet in height, and about as thick as a man's fore-arm. It is thriving wonderfully. In consequence, when lately in Calcutta, I brought up from thence, seven hundred Cabool walnuts, and am rejoiced to say, that they are *all* coming up. I have sent for more, as the introduction of this tree is very desirable not only for the fruit, but the wood.

"In making a large tank here, I had the earth raised in the centre so as to form an island, about 30 yards in diameter—the water around it is from fifteen to twenty feet in depth. The white ants have all perished—and whatever *slips* are *cut* off and stuck in the soil on the island, grow. Even sweet-brier, of which I have a great number now growing there. This shews that the climate agrees with such plants, which I find *will not* succeed, in the gardens where few slips strike and root, and if they do the white ants never allow them to escape, I mean of the sweet-brier, white provence rose, &c."

In a letter of a later date, Col. Ouseley mentions that the American sumach is growing beautifully in his garden, and that he is desirous of trying the French madder seed in the government experimental garden, which has been lately formed at Kishenpore (in Chota Nagpore,) principally with the view of cultivating the coffee plant. Col. Ouseley observes, "I do not know whether you are aware that the *finest* coffee produced in India is grown in my own experimental garden. I send you the report* on which the government sanctioned the garden they have up here, and am anxious that people should know that the climate and soil agree so well with the culture of coffee."

The Esculent Roots of Central Africa.

The paper next submitted was a letter from Dr. Wallich, forwarding a communication to his address from the Rev. Mr. Livingstone, dated Mabotsa, 12th August 1844, in reply to a letter from Dr. Wallich, in which his (Mr. Livingstone's) assistance was requested on behalf of the Society, in accordance with the resolution of a general meeting held on 8th November 1843, with the view of procuring a supply of the superior sorts of esculent roots which abound in Central Africa. In this letter the Rev. Mr. Livingstone intimates the steps he has already taken to meet, in part, the wishes of the Society, and hopes that not many months will elapse before he shall be able to announce the despatch of his first assortment to its final destination. He then alludes to his future plan of operations, and gives some interesting details respecting several of the esculents which are to be found in the most dry and sterile situations, and which afford, without cultivation, the chief food of the Bushmen and other natives of the desert.

---

* The Report will be found with the Correspondence in this number.—Eds.

Resolved,—That the best acknowledgments of the Society be given to Mr. Livingstone for the trouble he has so kindly taken in meeting its wishes, as also to Dr. Wallich for the assistance he has so readily rendered to the Society on the occasion.

The letter of Mr. Livingstone was referred to the Committee of Papers for publication in the Journal.

Nerbudda Wheats.

Extracts of letters were read from Dr. Greig at Seetapore, and Capt. Hollings at Lucknow, regarding the Nerbudda wheats received from Col. Ouseley. Dr. Greig writes—his letter is dated 26th April,—" Since my last communication, I am sorry to tell you, that the Nerbudda wheats have been entirely destroyed by rust. The produce has not been so much as the seed sown. The plants throve amazingly well until prostrated by a heavy fall of rain, after which they were attacked by the rust, and the grain blighted. The soil in which they were sown is a deep red loam, which had been previously supplied liberally with vegetable mould in a decayed state. A little powdered oil-cake was sprinkled among the growing plants."

Capt. Hollings observes, that—" The rubbee harvest has been a good one, and although the wheat from Hoosungabad seed is not so fine as might have been expected, it has produced a larger and better filled grain than is usually seen here."

Communications on various subjects.

The following letters and papers were also submitted:

1. From C. K. Robison, Esq., enclosing a list of the timber trees of the province of Malacca, prepared by Mr. Westerhout, Assistant Resident there, at the suggestion of the late Mr. Griffith, and intimating that it will be shortly followed by specimens of all the timbers enumerated in the list.

2. From Dr. Wallich, forwarding, at the request of the author, Mr. Ross, a paper containing hints for plant collectors.

3. From Major T. E. A. Napleton, Secretary of the Bauglepore Branch Agri-Horticultural Society, submitting an account of a show of vegetables, fruits, &c., held at that station on 13th April.

4. From Dr. Wallich, furnishing some further documents on the subject of the American sumach, consisting of extract of letter from Captain Budd of Hoonsoor, to Col. Tulloch, Commissary General at Madras, and of another letter to his own address from Mr. Teil at Kidderpore.

With reference to the above letter from Mr. Teil, and to those submitted by Dr. Wallich at the last meeting, it was proposed by the President, and resolved,—that the Secretary do communicate to Dr. Wallich the request of the Society, that he will inform Mr. Teil of the sense they entertain of the service he has rendered to the manufacturing and agricultural interests by his satisfactory trial and report connected with the American sumach produced in the H. C. Botanic Garden.

5. From C. B. Taylor, Esq., annexing extract from the "Library of Entertaining Knowledge," treating of vegetable substances, regarding the *Nerium tinctorium,* which is there stated to produce an indigo of excellent quality, and at much less labor and cost than the indigo produced from the *Indigofera tinctoria.* Mr. Taylor recommends an application for seed of this variety to some of the Society's correspondents in the Carnatic or the Circars, where it grows plentifully, with a view to its general distribution on this side of India.

The Secretary intimated, that on receipt of the above letter he had placed himself in communication with Dr. Wight,—having previously ascertained from Dr. Wallich that he had not any seeds or plants of this tree for distribution from the Botanic Garden,—requesting his assistance in procuring a quantity of seed, and any additional information regarding the tree which he might be able to afford. The seed had lately come to hand through the kindness of Dr. Wight, and was now on the table available to any Members disposed to give it a trial, and he hoped shortly to receive the desired information from that gentleman.

All the above communications were referred to the Committee of Papers.

6. From D. F. McLeod, Esq., intimating that a piece of ground has been selected for a garden, for the Branch Agri-Horticultural Society at Benares, and requesting to be furnished with an assortment of seeds.

The Secretary mentioned, that this request had been complied with as far as the present means of the Society would admit.

7. From Mr. John Cameron, submitting a few beautifully executed drawings of Agricultural implements from Messrs. Slight and Co., Civil and Agricultural Engineers, Edinburgh.

8. From Col. L. R. Stacy, alluding to the circumstance of his having sent to England a quantity of the Butea kino, with the view of ascertaining its value, and to a plan, which he adopted with success, of sending cuttings of plants from one part of the country to another.

9. From P. P. Carter, Esq., of Bojepoor Factory, near Buxar, dated 23rd March, referring to his plantation of Mexican cotton. Mr. Carter states—"You will be sorry to hear, that the produce this year, both in quality and quantity, is far inferior to the last; in fact it is almost a total failure. All the cotton as yet gathered by myself and those to whom I distributed seeds is more or less *soiled, harsh* and *short in staple;* most of the bolls dropping before coming to maturity, while the plants at the same time appear healthy. I had hopes, that the dry westerly winds setting in in December would have checked the progress of these little red insects, which have proved so destructive to the cotton; but they are now just as, if not more, numerous than ever.

"The destruction of these insects is generally complained of this season, and I witnessed their effects on the cotton grown in the Branch Agricultural and Horticultural Garden at Bauglepore also, exactly as I have found them here: and I see a correspondent in the Society's Journal, writing from Dacca, mentioning the same circumstance. I have tried every means I could think of for destroying, or at least driving them away, but without avail; even smoke appears to have no effect on them. I shall with pleasure send you as much of the Mexican seeds as I have gathered from my crop, which may be about two or three seers, and shall despatch it by an early opportunity per Government Steamer."

In a subsequent letter (April 1st,) when sending the seed alluded to among the presentations, Mr. Carter adds—"You will perceive, that a good many of them have been injured by insects perforating the pods, as I mentioned in my last. I still look forward with great hopes of the hot weather producing a better crop of cotton than I have yet had this year, and of the insects being in some measure dispelled or destroyed, as the plants have been within the last few days throwing out new shoots and blossoms."

The Secretary mentioned, that similar complaints had reached him from correspondents at Rungpore, Gorruckpore, and from the Government plantation at Rungpore, where these insects have been attacking the cotton in a most destructive manner. He had received a quantity of the infected pods, which he had transferred to a naturalist, who had kindly promised to examine them, and endeavour, if possible, to suggest some remedy for their ravages.

10. From Dr. W. H. Bradley at Ellichpore, dated March 28, acknowledging the receipt of a quantity of China tea seeds, sent to him by the Society. Dr. Bradley writes, " I have to thank you for the very welcome and unexpected supply of Tea seeds. The period of their arriva gives a very fair opportunity for testing this locality as a *Tea Range* and rest assured I shall not fail to furnish you with my results. essayed last year, but the seeds forwarded from the Bombay Horticultural Society were bad, and never germinated; those you have been so kind as to send are fresh, and shew every likelihood of doing well. Al we want upon these adjoining hills is water, and this desideratum is now about to be supplied by our repairing an ancient tank we found upon the summits, the bund of which had been cut through, purposely some hundred years ago. We expect to retain by our repairs a body of water of nearly a mile in area, and having a depth of about fifteen o twenty feet, more or less. The soil here is wacken beds, having basalt interstratified, a formation not very retentive of moisture, but with the debris of these soft trap rocks, loaded so strongly as they are with iron I sanguinely anticipate success to a tea plantation."

11. From Major T. E. A. Napleton, returning thanks for a supply of American maize, and offering to send a quantity of artichoke, cauliflower, beet, and mignionette seed.

For all the above communications and presentations the thanks of the Society were accorded.

(

C. K. Robison, E

Members Elected.

The gentlemen proposed at the last meeting were duly elected members of the Society, viz :—

Lieutenant C. S. Reynolds, J. H. W. Cox, Esq., Dr. Alexander Duff and the Hon'ble Mr. Justice Carr.

Candidate for Election.

Lieut. Olpherts of the Artillery, was proposed as a member by Capt. F. C. Burnett, seconded by C. K. Robison, Esq.

Presentations to the Library.

1. The Calcutta Journal of Natural History, No. 21. *Presented by Dr. McClelland.*

2. Report of the London E. I. and China Association for 1844. *Presented by the Association.*

3. The India Journal of Medical and Physical Science, No. 6 of vol. 3. *Presented by Dr. Finch.*

Garden and Museum.

1. A small supply of Egyptian and Taganrog wheats, of white gram from the south of Europe, and of American maize. *Forwarded by the Overland Mail by Dr. Royle, from the India House.*

Dr. Royle observes, that the Taganrog wheat is valuable for its nutritious qualities, from the quantity of gluten it contains, and is moreover well fitted for making macaroni and vermicelli.

2. Seventeen more plants of the stemless palm of Surgooja. *Presented by Col. J. R. Ouseley.*

The Secretary mentioned, that all these plants had reached in good condition, and had been planted out in the nursery.

3. A small quantity of Ceylon tobacco seed, much esteemed by the Singhalese. *Presented by John Owen, Esq.*

4. A small supply of an artificial manure. *Presented by T. F. Henley, Esq.*

5. Three skins tanned separately with the American sumach, and with the Babool bark. *Presented by Dr. Wallich.*

Dr. Wallich states, that these skins have been prepared by Mr. Teil, in continuation of his former experiments, which were communicated at the two last meetings of the Society. Dr. Wallich also submits copy of a letter to his address explanatory of these experiments. This letter was referred to the Committee of Papers, for publication in the Journal.

6. A packet of beans. *Presented by A. Scott, Esq.*

The following is the memorandum submitted with the above packet:—

Memorandum.—In January 1844, Capt. F. C. Burnett presented the Society with a little packet of a particular description of bean, which he stated to be a small portion of the produce of *one plant* raised in his garden at Dum Dum. The bean from which this one plant was raised was received by Capt. B. with a large assortment of other seeds from Affghanistan, and was the only seed that germinated. On the occasion of presenting this little packet, Capt. Burnett alluded to this single plant as being most prolific, and the produce very palatable.

In October 1844, a few of these seeds were given to Mr. Scott, of Seebpore, who put them immediately in the ground. He states that they germinated very readily, soon produced, and have continued yielding from that period to the present time, and are still (May) full of pods, bearing out most fully the report of Capt. Burnett. Mr. Scott mentions that he has distributed the produce to several parties.

Receipt of the Bust of the Rev. Dr. Carey.

The Secretary stated he had the pleasure to announce to the meeting the receipt, by the *Madagascar*, of the bust of the late Dr. Carey. In consequence of there not being room for it in the Society's present apartment, he had given it temporary accommodation in his own residence, pending the Society's removal into the Metcalfe Hall.

In his letter advising its despatch, received by the last mail, Dr. Royle observes, "I think the bust an admirable one, and which General Macleod immediately recognized as one of your much-esteemed founder. It was done from the picture of Dr. Carey in this country."

An Artificial Manure for the Sugar-cane.

The subject which next came before the meeting had reference to the artificial manure alluded to among the presentations, and which was accompanied with the following letter from the presenter:—

To JAMES HUME, ESQ., *Honorary Secy. Agricultural Society.*

DEAR SIR,—I beg to transmit you herewith a small quantity of artificial manure, compounded in accordance with the modern principles of agriculture, and specially with reference to the cultivation of the sugar-cane.

I would suggest that as the season for experimenting on manures is now approaching, that a comparative experiment be made with the artificial compound, and ordinary cow-dung or farm manure, in the proportion of eight ounces of the compound salt against 15 pounds of ordinary manure, per cane hole, or stool of canes. The object being not so much to endeavour to surpass ordinary manure, as to find an economical compound which would serve the planter's purposes as a fertiliser, after all his other stores of manures are exhausted, and, moreover, if possible, render permanent his plantations, on the principle laid down by Leibig of restoring annually to the soil an equivalent for the salts we have removed in the preceding crop. The compound now sent contains all the phosphates, silicates and alkalies, with salts of ammonia, such as a silica plant like the sugar-cane demands from the soil for its development, all of which elements are to be had abundantly and cheaply in this country.

A compound similar to that now sent has been employed in Mauritius with the most complete success, having in its fertilizing powers on the sugar-cane exceeded the effects both of guano, stable manure, and vegetable composts.

I would recommend that the artificial manure should be applied at twice, that is, in the proportion of about 4 ounces each time, at an interval of two months, during the rainy season, being well mixed up with the soil for about 18 inches, all around the cane stool. If applied in one spot or *en masse*, it would have an injurious effect on vegetation, from its concentrated nature. It is best applied to young canes of some 18 inches or two feet high. It will also, in all probability, keep away white ants. I remain, &c.

T. F. Henley.

The Secretary was requested to transfer this manure to the garden overseer, with a view to giving effect to the suggestions of Mr. Henley.

Report on Kemaon Pouchong Tea.

The Secretary mentioned that, in accordance with the resolution of the last meeting, he had submitted to the Assam Tea Company the specimen of Kemaon Pouchong tea sent down by Dr. Jameson, and he had been favored with a report from Mr. Rogers, the Honorary Secretary, to the effect that the sample has been well manufactured, the twisting and sorting of the leaves being if anything superior to that of the Assam Pouchong teas. The flavor is stated to be similar to that from Assam, and its strength equal; but the sample has been rather overburnt.

Vegetable and Flower Seeds from England and the Cape.

Letters were submitted from Messrs. Veitch and Son of Exeter, and Messrs. Villet of the Cape, regarding the Society's annual consignment of vegetable and flower seeds. The former state that they have already despatched a consignment, and the latter intimate their intention of doing so at the latter end of April; so that in all probability both despatches will arrive in the early part of July.

Communications on various subjects.

The following letters and papers were also laid before the meeting:—

1. From C. Beadon, Esq., Under Secretary Government of Bengal, forwarding copies of Mr. J. O. Price's cotton reports, from September 1844 to April 1845.

2. From A. L. Harris, Esq., dated London 18th April, giving an account of the mode of cultivating the Cacao, as practised in the West Indies.

3. From Major T. E. A. Napleton, Honorary Secretary of the Bauglepore Branch Agri-Horticultural Society, submitting an account of the fourth and last exhibition of vegetables, fruits, &c., for 1844-45, held at Bauglepore, on 30th May.

4. From P. Homfray, Esq., submitting an account of the successful propagation by seed, of a superior variety of mango.

The Secretary stated that the fruit sent to him by Mr. Homfray was small in size, and very superior in flavor.

The above four communications were referred to the Committee of Papers.

5. From the Secretary of the Kandyan Improvement Society, requesting to be furnished with a supply of different kinds of seed paddy.

The Secretary intimated that previous to carrying this request into effect, he had written for more definite instructions in regard to the quantity, &c. of seed required.

6. From Sir Lawrence Peel, expressing his readiness to meet the request of the Society for plants from his garden.

7. From Messrs. J. Mackey and Co., stating that Messrs. Smith and Campbell of Sydney, have promised to send by the first opportunity, the Van Dieman's Land and New South Wales' wheats, indented for by the Society.

The Secretary having mentioned that he had had several recent applications for Nerbudda wheats and white linseed, it was agreed that Col. Ouseley's assistance be solicited, with a view to the obtaining of small supplies of these seeds from that quarter.

Moon's Phases.	t 9 H. 50 M.					Observations Made at Apparent Noon.					Observed at 4 P. M.					Observations Made at Sun-set.					Rain Gauges.	
		ture.			Wind.		Temperature.			Wind.		Temperature.			Wind.		Temperature.			Wind.	Elevation.	
	Barometer reduced to 32° Fahrenheit.	Of the Mercury.	Of the Air.	Of Wet bulb.	Direction from Sun rise to 9 h. 50 m.	Barometer reduced to 32° Fahrenheit.	Of the Mercury.	Of the Air.	Of Wet bulb.	Direction from 9 h. 50 m. to Noon.	Barometer reduced to 32° Fahrenheit.	Of the Mercury.	Of the Air.	Of Wet bulb.	Direction from 2 h. 40 m. to 4 p. m.	Barometer reduced to 32° Fahrenheit.	Of the Mercury.	Of the Air.	Of Wet bulb.	Direction from 4 p. m. to Sun set.	Feet. 56 Upper.	Feet. 4 Lower.
	Inch		°	°		Inches	°	°	°		Inches	°	°	°		Inches	°	°	°		Inches	Inches
	29,8[illegible]	,2	87,2	78,0	N.	29,821	92,5	93,0	79,0	S. E.	29,675	90,0	89,5	77,0	W.	29, ..	..	..	..	N. W...	0,69	0,80
	,8 8	,5	79,5	74,8	E.	,801	80,5	81,8	74,0	S. E.	,680	83,0	81,5	72,0	S. S. E.	,706	77,0	76,0	70,0	S. S E.	..	..
	,807	,5	75,5	71,4	E. S. E...	,769	83,5	85,0	77,0	S. E.	,668	90,0	87,0	76,4	S.......	,728	70,0	70,0	68,0	N. E. ..	0,52	0,58
	,886	,0	74,0	70,2	N. W. ..	,845	77,5	78,0	73,0	N. N. E.	,743	81,0	89,0	73,0	N. E. ..	,768	77,0	76,2	70,5	N. E. ..	0,32	0,38
	,921	,5	77,0	72,0	E. S. E...	,881	82,5	82,5	72,0	N.	,775	86,5	85,0	72,9	N.	,780	83,0	82,0	72,0	N. N. E	0,08	0,12
	,9 5	,8	78,8	73,0	N. S. E...	,864	84,8	83,8	73,5	E.	,784	87,0	86,5	73.5	E. N. E.	,797	83,8	83,0	72,5	E. N. E.	..	..
●	,890	,0	84,5	77,0	S. W.....	,843	89,0	89,0	76,8	E	,717	91,8	90,5	76,2	S. E. ..	,740	88,0	87,0	76,0	S. E. ..	..	..
	,851	,0	87,0	77,8	N. W. ..	,782	89,5	90,4	78,0	W.	,670	90,0	89,4	78,0	N. W...	,688	85,4	85,2	77,2	N. W...	0,93	1,01
	,800	,0	84,2	79,2	E. N. E.	,744	85,5	87,0	79,5	N. W. ..	,720	75,0	75,2	73,0	N.	,736	75,5	74,5	72,0	N.	1,35	1,44
	,802	,5	84,0	78,6	N. E.....	,754	86,5	87,0	79,5	E.	,672	90,0	90,0	77,0	S. S. E	,691	86,0	85,8	77,0	S. S. W.	..	..
	,727	,4	87,8	81,0	N. E.....	,703	89,5	90,0	81,8	S. E.	,590	90,5	89,8	83,5	W.NW.	,591	86,2	86,0	81,5	N.	..	..
	,708	,5	89,0	82,0	S.	,682	92,4	93,8	85,5	S. S. E...	,601	95,0	94,0	84,5	S. E. ..	..	..	..	..	S. E. ..	..	..
	,723	,0	90,0	82,0	N. W. ..	,708	93,0	94,0	85,0	S.........	,620	96,0	95,0	85,0	S. E. ..	,626	88,0	87,0	82,0	S.	..	..
	,769	,0	88,2	81,5	S. S. E...	,737	92,5	93,0	83,5	S.........	,671	94,0	94,0	84,0	N.	,673	88,0	88,0	81,0	S. E. ..	..	..
☾	,786	,0	88,5	81,0	S. S. W.	,757	91,0	92,0	82,2	S.........	,668	95,0	94,0	83,8	S.......	,673	89,0	88,0	80,0	S. S. W.	..	..
	,774	,0	89,0	81,0	S.........	,748	91,0	91,5	81,0	S. W....	,652	92,2	92,5	82,0	S. E. ..	,650	87,0	87,0	80,0	S. E. ..	..	..
	,771	,0	89,2	80,5	S. W.....	,741	91,0	91,5	82,0	S. W....	,648	91,0	91,0	81,2	S. W...	,657	87,0	87,0	80,0	S. W...	..	..
	,794	,0	89,0	80,5	W. S. W	,773	91,0	92,0	82,0	S. W....	,666	92,0	91,5	81,5	S. W...	,681	86,0	86,0	80,0	S. W...	..	..
	,780	,5	89,2	81,1	S. W.....	,762	91,0	92,0	82,5	S. W....	,657	93,0	92,0	82,4	S. W...	,668	87,0	87,0	80,0	S. W...	..	..
	790	,0	90,0	80,5	S. W.....	,767	92,4	93,5	81,5	W. S. W.	,678	97,5	97,0	80,0	S. W...	,686	89,0	88,0	80,0	S. S. W.	..	..
	786	,3	89,0	80,0	S. E.....	,761	90,8	92,0	80,5	S. W....	,665	91,4	91,0	81,5	S. E. ..	,659	87,0	87,0	80,5	S. E. ..	..	..
○	,843	,0	89,4	80,0	S.........	,824	91,2	91,0	81,0	S........	,718	91,0	90,0	83,8	S.	,770	86,5	87,0	79,0	S.	..	..
	,883	,0	89,5	80,0	S. W.....	,858	91,0	92,4	80,5	S.........	,736	91,5	91,0	80,0	S.	,771	86,0	86,5	79,0	S.......	..	..
	,839	,0	88,8	80,6	S. E.	,815	92,0	92,2	79,5	S.........	,763	80,0	89,0	80,0	S.	,757	85,0	86,0	79,0	S.......	..	..
	,829	0	87,3	80,5	S. W.	,812	90,0	91,0	82,0	S.........	,727	76,0	77,0	75,0	S.	,724	76,0	78,0	76,0	S. E. ..	0,79	0,87
	819	,0	87,[illegible]	81,0	W. S. W.	,787	90,0	90,0	82,0	S.........	,745	81,0	80,2	76,0	S.	,730	80,5	81,0	77,0	S. W...	0,05	0,06
	834	,0	89,[illegible]	80,8	S. W......	,810	92,0	93,0	80,0	S. W....	,719	94,0	92,8	81,0	S. W...	,713	93,0	90,0	80,0	S. W...	..	..
	845	,5	89,[illegible]	81,4	E. S. E...	,813	92,9	93,0	81,4	S. W....	,695	93,0	92,0	81,0	S.	,734	86,0	86,0	79,5	S. E. ..	0,70	[illegible]
	,826	,0	86[illegible]	80,0	S. W.....	,795	90,0	90,4	83,0	S. W	[illegible]	[illegible]	[illegible]									

. The Observations marked with Asterisks, signifying that clouds intervened at the time, are not included in the mean, 107,°9.

ometer by Troughton used prior to the 1st June 1844, Observations reduced to 32° Ft. = 29,493

Moon's Changes.	H. 50 M.					Observations Made at Apparent Noon.					Observed at 4 P. M.					Observations Made at Sun set.					Rain Gauges.	
		Tem		ure.	Wind.		Temperature.			Wind.		Temperature.			Wind.		Temperature.			Wind.	Elevation.	
	Barometer reduced to 32° Fahrenheit.	Of the Mercury.	Of the Air.	Of Wet bulb.	Direction from Sun rise to 9 h. 50 m.	Barometer reduced to 32° Fahrenheit.	Of the Mercury.	Of the Air.	Of Wet bulb.	Direction from 9 h. 50. m. to Noon.	Barometer reduced to 32° Fahrenheit.	Of the Mercury.	Of the Air.	Of Wet bulb.	Direction from 2 h. 40 m. to 4 p. m.	Barometer reduced to 32° Fahrenheit.	Of the Mercury.	Of the Air.	Of Wet bulb.	Direction from 4 p. m. to Sun set.	Feet. 56 Upper.	Feet. 4 Lower.
	Inches	°		°		Inches	°	°	°		Inches	°	°	°		Inches	°	°	°		Inches	Inches
	29, ..	.	..	..	S. S. E.	29, ..	..	..	..	S. S. E. ..	29,675	93,5	92,5	81,7	S. S. E.	29,688	88,5	88,0	80,0	S. S. W.	..	..
	,833	,5	85,2	77,0	N. E. ..	,796	90,2	90,8	81,0	S. E.	,700	79,5	80,0	72,0	S. W...	,689	84,0	83,4	75,2	S.......	0,18	0,29
	,847	,8	85,5	75,5	W.	,818	89,4	89,0	78,0	S. E.	,684	93'0	92,2	80,0	S. E. ..	,668	87,5	87,0	79,0	S. E. ..	..	..
	,840	,5	86,5	75,5	N. N. E.	,828	90,0	91,0	77,0	W.	,713	94,0	92,7	75,5	N W.	,729	90,0	88,5	79,0	N. N. W.	..	..
	,843	,0	90,0	80,0	S. W. ..	,817	93,0	94,3	81,5	E.	,718	94,0	93,0	80,5	E.	,711	89,0	88,0	76,0	E.	..	..
●	,773	,0	89,4	80,2	N. E. ..	,731	94,0	95,6	83,0	S. W.....	,641	95,0	95,0	84,4	N. E. ..	,647	90,3	90,4	79,2	N. E. ..	..	..
	,717	,5	92,5	82,8	S. W...	,685	96,0	96,5	83,0	S. W.....	,584	97,0	96,0	82,5	S. W. ..	,568	91,0	91,0	82,2	S. W...	..	..
	,700	,2	91,0	82,4	S. W...	,669	97,0	97,5	80,0	W. S. W.	,556	100,0	99,4	83,0	S. W...	,568	91,0	91,0	82,0	S. W...	..	..
	,645	,0	94,2	82,0	Calm...	,613	95,5	97,0	81,5	N. W.....	,528	95,0	93,2	83,0	Calm. ..	,551	89,0	89,0	81,0	Calm. ..	..	..
	,653	,0	92,5	83,0	N. E ..	,629	94,5	95,1	82,0	S. E.	,534	96,8	93,0	78,5	E.	,565	84,0	82,0	77,0	E.	..	..
	,703	,0	89,0	79,8	Calm...	,661	93,0	93,0	81,5	S. E.	,559	94,9	94,0	81,5	S.	,583	89,8	*89,8	78,5	S.......	0,02	0,06
	,731	,0	86,1	74,8	S. W. ..	,683	92,0	92,5	81,0	S.........	,592	95,0	94,7	81,0	S. W...	,603	89,0	89,0	79,5	S. W. ..	..	..
	,665	,2	91,5	82,0	E.	,629	95,0	95,5	80,4	S.........	,551	97,0	96,0	79,0	S. ...	,575	89,2	89,0	77,0	S. W. ..	..	..
☾	,729	,5	91,0	78,5	N. E. ..	,710	92,0	92,5	79,5	N. E.	,636	90,1	89,5	77,8	S. E. ..	,634	88,0	87,8	77,0	S. E ..	..	..
	,708	,5	87,0	80,0	S. W...	,678	89,0	88,4	80,5	S. E.	,595	90,0	88,0	79,8	S. ...	,641	85,0	84,0	78,0	S.......	..	..
	,699	,5	91,5	82,0	S. W...	,652	95,0	96,3	82,0	S. W.....	,564	98,5	97,0	84,0	S. W...	,563	90,5	90,0	82,8	S. W...	..	..
	,661	,5	93,4	84,0	S. W...	,630	96,0	97,0	85,8	S. W.....	,557	95,0	94,0	84,5	S. W...	,582	89,5	90,0	84,0	S. W...	..	..
	,684	,0	94,0	83,1	S.......	,660	97,0	97,9	84,9	S. W	,584	97,0	96,0	84 0	S. W...	,563	89,5	89,4	83,4	S. W...	..	..
	,633	,0	93,2	81,5	S. W...	,603	97,5	97,5	85,5	S. W.....	,511	99,0	98,0	86,0	S. W...	,526	91,0	91,0	84,0	S. W...	..	..
	,617	,0	93,5	84,5	S. W...	,588	96,5	97,0	85,0	S. W.....	,508	97,5	96,2	84,8	S. W...	,530	90,0	90,0	82,5	S. W...	..	..
○	,654	,8	91,2	83,0	Calm ..	,614	97,0	97,5	82,8	S. W.....	,532	97,0	96,0	83,0	S. W...	,502	82,0	80,0	78,2	N. W...	0,65	1,58
	..	.	..	..	S. W...	..	..	..	..	S. W.....	,610	94,0	93,0	81,5	S. W...	,613	89,2	89,0	80,2	S. W...	..	..
	,741	,5	91,0	83,0	S. W...	,807	72,0	73,0	71,0	S. E.	,676	94,8	95,0	73,0	W.	,678	75,8	76,0	74,5	W.	0,25	0,32
	..	.	..	..	S. W...	,715	90,0	90,0	84,0	N. W....	..	..	..	..	W.	..	..	..	..	N. W...	..	..
	705	,5	91,2	83,0	S. W. ..	,667	93,5	93,8	83,0	S. W.....	,568	95,0	94,0	82,0	S. W...	,617	85,0	86,0	79,0	S. W...	..	..
	717	,5	91,5	81,5	S. E. ..	,669	95,0	94,2	82,0	S. S E. ..	,597	87,0	96,5	79,0	S. E. ..	,615	83,0	83,0	77,0	E. S. E.	..	..
	695	,0	90,4	83,0	E.	,656	93,0	92,0	32,0	E. S. E. ..	,600	84,3	83,0	78,0	E. ...	,580	83,0	84,0	77,0	E.	0,10	0,19
	698	,0	90,4	82,5	E. N. E.	,656	87,5	86,0	80,0	S. S. E. ..	,572	87,4	87,8	81,0	E. N. E.	,579	85,8	86,0	81,0	E. N. E.	..	..
	621	,5	90,0	81,4	E.	,585	93,0	94,0	81,0	E.........	.497	89,5	91 0	8'.0	N.	..				[illegible]		

1. The Observations marked with Asterisks, signifying that clouds intervened at the time, are not included in the mean, 115,09.

rometer by Troughton used prior to the 1st June 1844, Observations reduced to 32° Ft. = 29.493
by Col. Everest used from 1st June to 31st August, ……… Ditto ……… = 29.637
.52, Standard Barometer by Newman, used from 1st Sept. ……… Ditto ……… = 29.654